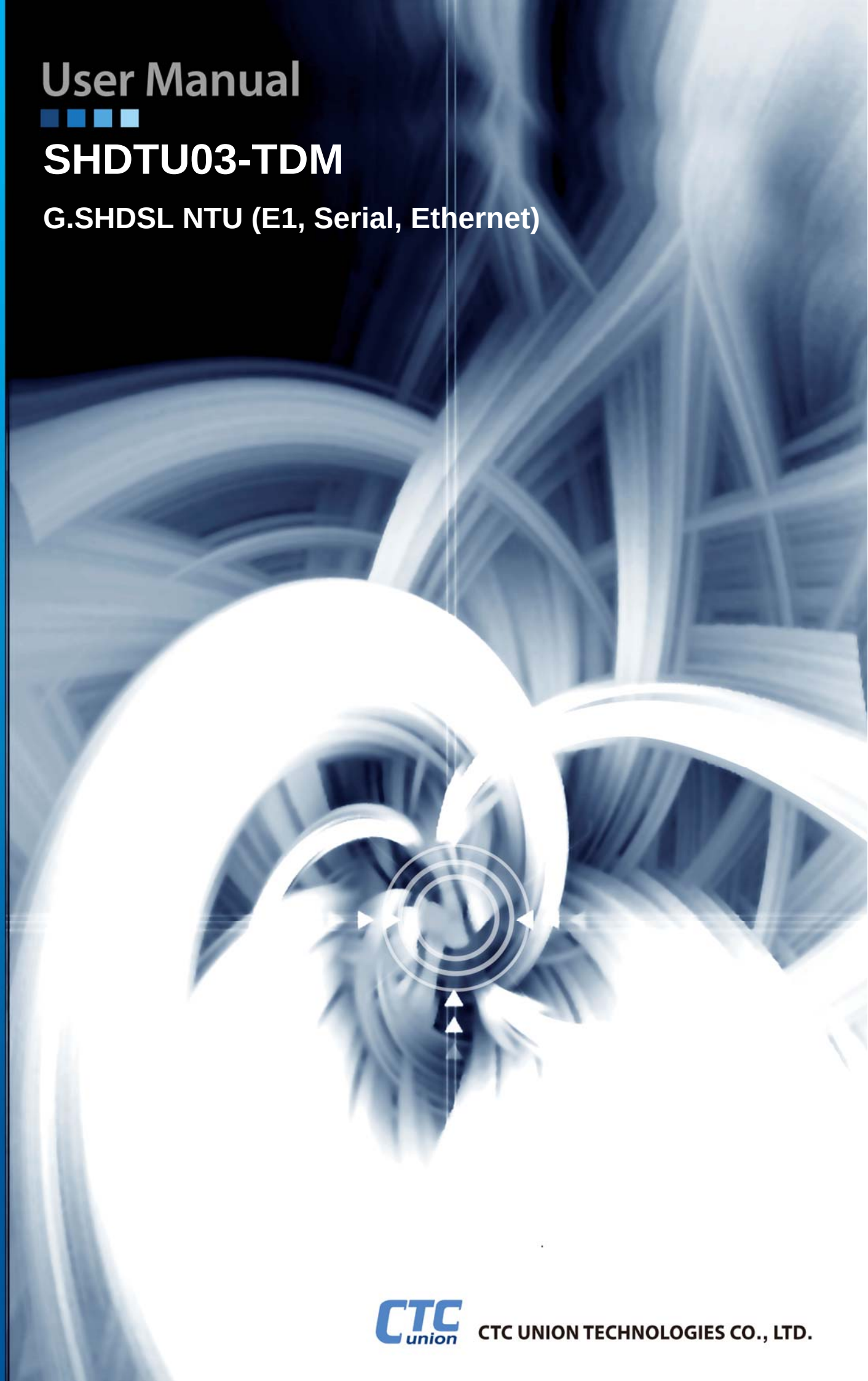
User Manual

SHDTU03-TDM

G.SHDSL NTU (E1, Serial, Ethernet)



CTC UNION TECHNOLOGIES CO., LTD.

The information in this publication has been carefully checked and is believed to be entirely accurate at the time of publication. CTC Union Technologies assumes no responsibility, however, for possible errors or omissions, or for any consequences resulting from the use of the information contained herein. CTC Union Technologies reserves the right to make changes in its products or product specifications with the intent to improve function or design at any time and without notice and is not required to update this documentation to reflect such changes.

CTC Union Technologies makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does CTC Union assume any liability arising out of the application or use of any product and specifically disclaims any and all liability, including without limitation any consequential or incidental damages.

CTC Union products are not designed, intended, or authorized for use in systems or applications intended to support or sustain life, or for any other application in which the failure of the product could create a situation where personal injury or death may occur. Should the Buyer purchase or use a CTC Union product for any such unintended or unauthorized application, the Buyer shall indemnify and hold CTC Union Technologies and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, expenses, and reasonable attorney fees arising out of, either directly or indirectly, any claim of personal injury or death that may be associated with such unintended or unauthorized use, even if such claim alleges that CTC Union Technologies was negligent regarding the design or manufacture of said product.

TRADEMARKS
Microsoft is a registered trademark of Microsoft Corp.
HyperTerminal™ is a registered trademark of Hilgraeve Inc.

WARNING:
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual may cause harmful interference in which case the user will be required to correct the interference at his own expense. NOTICE: (1) The changes or modifications not expressively approved by the party responsible for compliance could void the user's authority to operate the equipment. (2) Shielded interface cables and AC power cord, if any, must be used in order to comply with the emission limits.

CISPR PUB.22 Class A COMPLIANCE:
This device complies with EMC directive of the European Community and meets or exceeds the following technical standard. EN 55022 - Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment. This device complies with CISPR Class A.

WARNING:
This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

CE NOTICE
Marking by the symbol CE indicates compliance of this equipment to the EMC directive of the European Community. Such marking is indicative that this equipment meets or exceeds the following technical standards: EN 55022:1994/A1:1995/A2:1997 Class A and EN61000-3-2:1995, EN61000-3-3:1995 and EN50082-1:1997

CTC Union Technologies Co., Ltd.
Far Eastern Vienna Technology Center (Neihu Technology Park)
8F, No. 60, Zhouzi Street
Neihu District
Taipei, 114
Taiwan
Phone: +886-2-2659-1021
FAX: +886-2-2799-1355

SHDTU03 TDM Series 2-Wire SHDSL E1, Datacom and Ethernet NTU Modems

User Manual
Version 3.0 July 2010 (Combined all three manuals into one)

This manual supports the following models:
SHDTU03-E1 2-Wire SHDSL E1 NTU (TDM)
SHDTU03-Serial 2-Wire SHDSL V.35, RS530,X.21 NTU (TDM)
SHDTU03-ET100 2-Wire SHDSL Ethernet Bridge NTU (TDM)

All three of these series offer power options for AC, DC or AD (AC+DC).

This document is an updated release manual and printing. Please check CTC Union's website for any updated manual or contact us by E-mail at info@ctcu.com. Please address any comments for improving this manual or to point out omissions or errors to marketing@ctcu.com. Thank you.

Tables of Contents

1 INTRODUCTION 7

1.1 MODELS 7
1.1.1 E1 interface model 7
1.1.2 Data (V.35) interface model 7
1.1.3 Ethernet interface model 7
1.2 FEATURES 7
1.3 SPECIFICATIONS 8
1.4 ORDERING INFORMATION: 9
1.5 APPLICATIONS 9

2 GETTING TO KNOW THE SHDSL NTU 10

2.1 FRONT PANEL 10
2.1.1 E1 interface model 10
2.1.2 Data interface model 10
2.1.3 Ethernet interface model 10
2.2 REAR PANEL 12
2.2.1 E1 Interface Model 12
2.2.2 Data (V.35) Interface Model 13
2.2.3 Ethernet Interface Model 14
2.3 INSTALLATION 15
2.3.1 For E1 Interface 16
2.3.2 For Data Interface 17
2.3.3 For Ethernet Interface 18
2.4 CAUTION 19

3 CONFIGURING WITH KEYPAD AND LCD 21

3.1 KEY PADS 21
3.2 MAIN MENU TREE 22
3.3 MENU TREE FOR [SHOW STATUS] 23
3.4 MENU TREE FOR [SHOW STATISTICS] 26
3.5 MENU TREE FOR [SYSTEM SETUP] 29
3.5.1 Sub-Menu tree for SETUP E1 Interface 32
3.5.2 Sub-Menu tree for SETUP SERIAL Interface 35
3.5.3 Sub-Menu tree for SETUP Ethernet Interface 37
3.6 MENU TREE FOR [REBOOT SYSTEM] 38
3.7 MENU TREE FOR [SYSTEM DIAGNOSTIC] 39
3.7.1 Loopback Test 40
3.7.2 BER Test 43
3.8 PARAMETERS TABLE 44
3.8.1 E1 Interface Model 44
3.8.2 Data Interface Model 44
3.8.3 Ethernet Interface model 45

4 CONFIGURATION WITH CONSOLE PORT 46

4.1 LOGIN PROCEDURE 46
4.2 WINDOW STRUCTURE 48
4.3 MENU COMMANDS 49
4.4 MAIN MENU SUMMARY 49
4.5 [SETUP] CONFIGURATION 50
4.5.1 Configure Interface 52
4.5.2 Configure SHDSL parameters 53
4.5.3 Configure E1 parameters 57
4.5.4 Configure Data parameters 63
4.5.5 Configure Ethernet parameters 68
4.5.6 Enable and Disable Remote configuration 72
4.5.7 Restore factory default setting 73

4.6 [STATUS] VIEW THE SYSTEM STATUS 75
4.6.1 Show SHDSL Status *75*
4.6.2 Show Interface Status *77*
4.6.3 Show Current Performance *78*
4.6.4 View the Local and remote Statistics *79*
4.6.5 Clear Channel Statistics *83*
4.7 [SHOW] VIEW SYSTEM CONFIGURATION 84
4.7.1 Show general Interface *84*
4.7.2 Show configuration in listing format *85*
4.7.3 Show configuration in command script *87*
4.8 [REBOOT] REBOOT THE SYSTEM 89
4.9 [DIAG] DIAGNOSTIC – LOOPBACK AND BER TEST 90
4.9.1 Loopback test *90*
4.9.2 BER Test *91*
4.10 [UPGRADE] FIRMWARE UPGRADE 93
4.11 [EXIT] EXIT THE SYSTEM 98

5 APPENDIX 100

5.1 ABBREVIATIONS 100
5.2 DATA INTERFACE PIN ASSIGNMENTS 103
5.3 V.35 DB25(M) TO M.34(F) ADAPTOR CABLE 104
5.4 X.21 DB25(M) TO DB15(F) ADAPTOR CABLE 106
5.5 CONSOLE CABLE 108
5.6 E1 BALANCE CABLE 109
5.7 E1 UNBALANCE CABLE 110
5.8 ETHERNET CABLE 111
5.9 DSL CABLE 112
5.10 POWER CORD 113
5.11 ILLUSTRATION OF LOOPBACK CONNECTION DEVICE (E1) 114
5.12 ILLUSTRATION OF LOOPBACK CONNECTION DEVICE (DATA) 115

1 Introduction

1.1 Models

The G.SHDSL NTU Series offers three different interface models (E1, Data and Ethernet) for connecting customers to high-speed TDM services .This series has three models:-

1.1.1 E1 interface model

Products Number: SHDTU03-E1-AD 2W
It offers two different ways have connected customers to high-speed TDM services with two G.703 E1 interfaces (Balance 120Ω RJ45 jack and Unbalance 75Ω dual BNCs). The G.703 interface can carry 64kbps to 2.048Mbps.

1.1.2 Data (V.35) interface model

Products Number: SHDTU03-Data-AD 2W
It offers customers premises has high-speed TDM services with a DB25 interface. The industry standard DB25 interface can be configured as a V.35/RS530 or V.36/X.21 connection. The DB25 connection can transfers data up to 2.304Mbps.

1.1.3 Ethernet interface model

Products Number: SHDTU03-ET100-AD 2W
It offers customers premises has high-speed TDM services with a LAN interface. The industry standard LAN interface can detect a 10Mbps or 100Mbps connection automatically.

The SHDSL TDM Series Modems can be configured and managed via EOC, or menu-driven VT100 compatible Asynchronous Terminal Interface, either locally or remotely.
The G.SHDSL NTU is equipped with an auto rate capability that identifies the maximum line rate supported by the copper loop. This powerful automatic configuration capability makes installation and service provisioning simple and painless. Further flexibility is provided in the ability to manually set the maximum NTU speed at different levels for different customer-tailored service offerings.

1.2 Features

- ✓ Standard G.SHDSL (ITU G.991.2) supports improved reach/speed and greater interoperability
- ✓ Fast and cost-effective provisioning of traditional frame relay (FR or T-HDLC) or TDM leased line services
- ✓ User existing copper loop infrastructures
- ✓ Can operate back to back connection
- ✓ Efficient single wire pair usage
- ✓ Up to 2.312Mbps symmetric service bit rate
- ✓ Auto rate installation maximizes data rate based on loop conditions
- ✓ Wetting current sink to protect SHDSL line
- ✓ Local management interface with LCD display
- ✓ Remote line loopback
- ✓ SHDSL Line performance monitoring (Data Rate and SNR)
- ✓ Raw and per time interval statistics
- ✓ Bandwidth guaranteed transmission equipment
- ✓ Remote firmware upgrade

1.3 Specifications

WAN Interface
- Line Rate: SHDSL per G.991.2
- Coding: trellis coded pulse amplitude modulation (TCPAM-16)
- Support: Annex A(ANSI) and Annex B(ETSI)
- Payload rates: 64kbps to 2.304Mbps (N x 64kbps N=1 to 36) for Data and Ethernet interface
  64kbps to 2.048Mbps (N x 64kbps N=1 to 32) for E1 interface
- Connection: RJ-45 jack (2-wire)
- Impedance: 135 ohms

G.703 Interface (as E1)
- Connection: RJ-45 for balanced 120Ω E1 cable
- Connection: BNC for unbalanced 75Ω E1 cable
- Line Rate: 2048KHz +/- 50ppm
- Framing: PCM30/30C/31/31C and Unframed
- Data Rate: 64Kbps to 2.048Mbps (Nx64Kbps , N=1 to 32)
- Operation: Full E1 and Fractional E1

DATA Interface (as V.35)
- Connection:DB-25(F)
- Payload rates: Up to 2.304Mbps (N=1 to 36)
- Supports RS-530, V.35 or V.36/X.21

LAN Interface (as Ethernet)
- Single Ethernet Interface
- 10/100Mpbs Half/Full Duplex, Auto-sensing, Auto-Crossover
- Up to 2048 MAC address learning

DSL Timing
- Internal
- From E1 Recovery (as E1)
- From DTE (as V.35 and Ethernet)

Performance Monitoring
- ES, SES, UAS, LOSW, Alarms, Errors

Loopback Tests (for E1 and V.35 interface only)
- Digital Local Loopback
- Digital Loopback
- Remote Line Loopback
- Remote Payload Loopback
- Far-end Line Loopback
- Far-end Payload Loopback
- V.54(For V.35 interface only)
- Build-in 2047 bit (2^{11}-1) BER tester

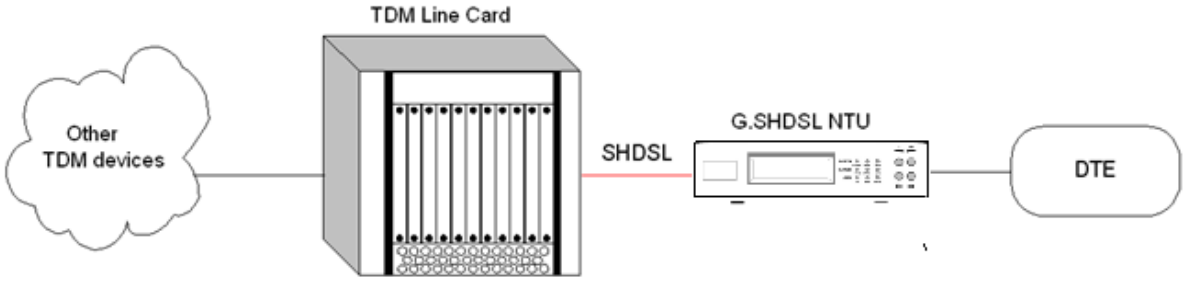
Management
- Configuration with keypads and LCD display
- Console port (RJ45)
- Support firmware upgradeable

Physical/Electrical
- Dimensions: 19.5 x 4.8 x 16.8 cm
- Input: For AC power input version 100 to240Vac with 50 to 60Hz
  For DC Power input version -36 to72Vdc
- Power Consumption: 12W Max
- Operation temperature: 0 to 35°C
- Humidity: Up to 95% (non-condensing)
- External screw for frame grounding

1.4 Ordering Information:

Interface	AC+DC Power	
E1 Interface	SHDTU03-E1-AD	
Data Interface	SHDTU03-Data-AD	
Ethernet Interface	SHDTU03-ET100-AD	
Multi Interface (E1+Data+Ethernet)	SHDTU03-31-AD	

1.5 Applications



Line Card to NTU Application

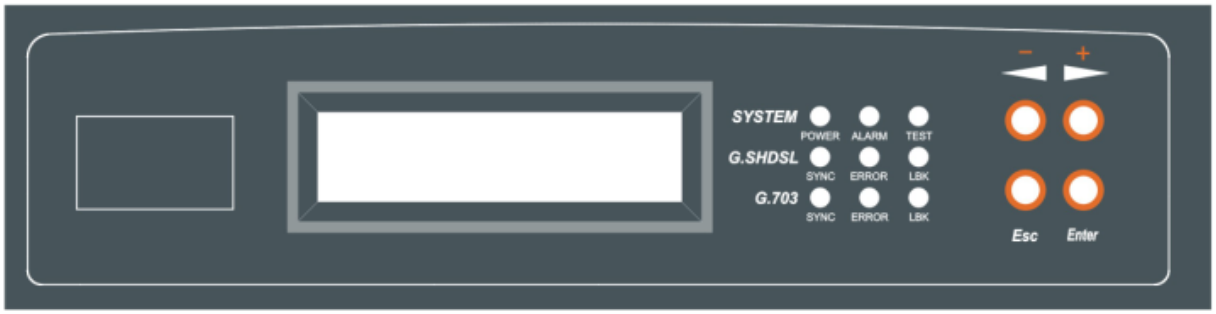
NTU to NTU Application

2 Getting to know the SHDSL NTU

This chapter shows the front and rear panel and how to install the hardware.

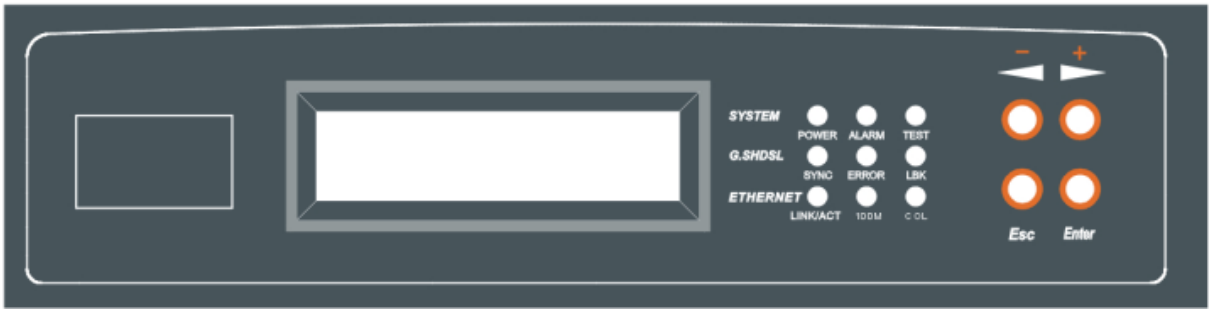
2.1 Front Panel

2.1.1 E1 interface model



2.1.2 Data interface model

2.1.3 Ethernet interface model



The front panel can be separated into three functional areas: LCD display, LED indicators and Keypads. The LCD display can show the status and configuration of the device. In this case, the local management interface will be done by keypads with this LCD display.
The purpose of key pads is to configure the setting or selecting functions on this SHDSL NTU.

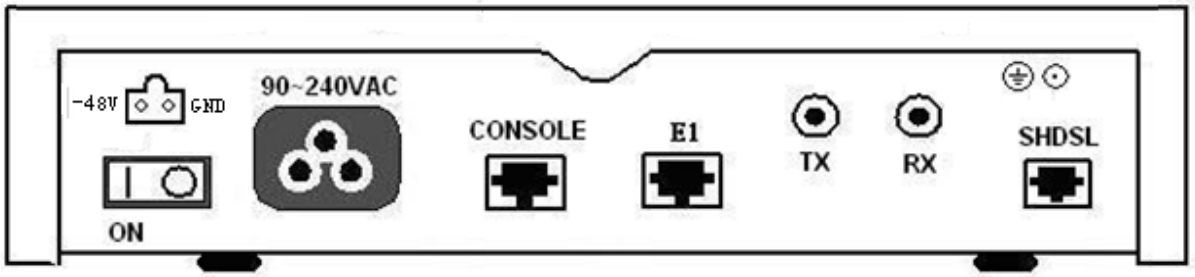
The following table describes the LEDs' function of device.

LED		Color	Action	Description
POWER		Green	On	Power is on.
			Off	Power is off.
ALARM		Red	On	System loss.
			Off	System is working nomarally.
TEST		Yellow	On	System is testing for connection.
			Off	System is working nomarlly.
G.SHDSL	**SYNC**	Green	On	SHDSL line is connected.
			Blink	Data transmit in SHDSL line.
			Off	SHDSL line is dropped.
	ERROR	Red	Blink	Error second occurs.
			Off	No error second.
	LBK	Yellow	On	Loopback is on.
			Off	Loopback is off.
G.703	**SYNC**	Green	On	E1 line is connected.
			Off	E1 line is dropped.
	ERROR	Red	Blink	There are error seconds.
			Off	There is not any error second.
	LBK	Yellow	On	Loopback is on.
			Off	Loopback is off.
Data	**TxD**	Green	On	Data transmit in V.35.
			Off	No data transmit in V.35.
	RxD	Green	On	Data receive in V.35.
			Off	No data reveive in V.35.
	ERROR	Red	Blink	Error second occurs.
			Off	No error second.
ETH	**LINK/ ACT**	Green	On	Data transmit in Ethernet.
			Off	No data transmit in Ethernet.
	100M	Green	On	Data receive in 100M.
			Off	No data receive in 100M.
	COL	Red	Blink	Error collision occurs.
			Off	No error collision.

2.2 Rear Panel

2.2.1 E1 Interface Model

AC+DC power input version

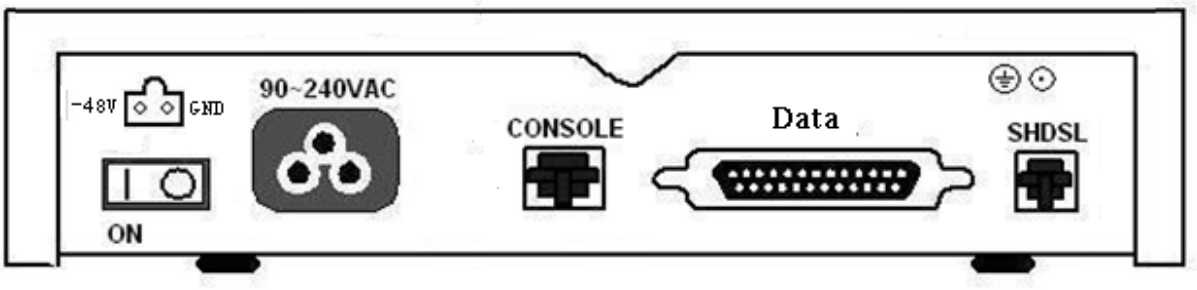


The rear panel of this model includes the power switch, AC+DC power socket, RJ-45 console, G.703 RJ-48C jack or BNC jack for transmitting and receiving and RJ-45 for SHDSL from left to right.

Connector	Description
ON	Power switch. Press 1 for turn on and press 0 for off
90~240V AC	IEC-320 C6 AC input connector. Adapts power from 90V to 240V
-48V GND	DC power input connector (-48V)
CONSOLE	RJ-45 for system configuration and maintenance
G.703	RJ-48C for 120Ω E1 connection with PABX (Private Automatic Branch Exchange) or E1 Router
TX	BNC for 75Ω E1 transmitting
RX	BNC for 75Ω E1 receiving
SHDSL	RJ-45 for DSL connection

2.2.2 Data (V.35) Interface Model

AC+DC power input version

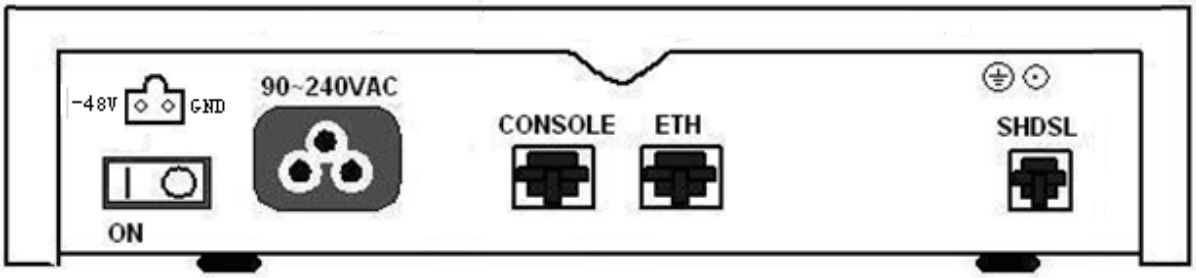


The rear panel of this model includes the power switch, AC+DC power socket, RJ-45 for console cable, DB-25(Female) for Data and RJ-45 for SHDSL from left to right.

Connector	Description
ON	Power switch. Press 1 for turn on and press 0 for off.
90~240V AC	IEC-320 C6 AC input connector. Adapts power from 90V to 240V
-48V GND	DC power input connector (-48V)
CONSOLE	RJ-45 for system configuration and maintenance
Data	DB-25(F) for RS-530 and V.35 or X.21(with adaptor cable)
SHDSL	RJ-45 for DSL Connection

2.2.3 Ethernet Interface Model

AC +DC power input version



The rear panel of this model includes the power switch, AC+DC power socket, RJ-45 for console cable, LAN for Ethernet cable and RJ-45 for SHDSL from left to right.

Connector	Description
ON	Power switch. Press 1 for turn on and press 0 for turn off.
90~240V AC	IEC-320 C6 AC input connector. Adapts power from 90V to 240V
-48V GND	DC power input connector (-48V)
CONSOLE	RJ-45 for system configuration and maintenance.
ETH	RJ-45 LAN port for Ethernet cable
SHDSL	RJ-45 for DSL Connection

2.3 Installation

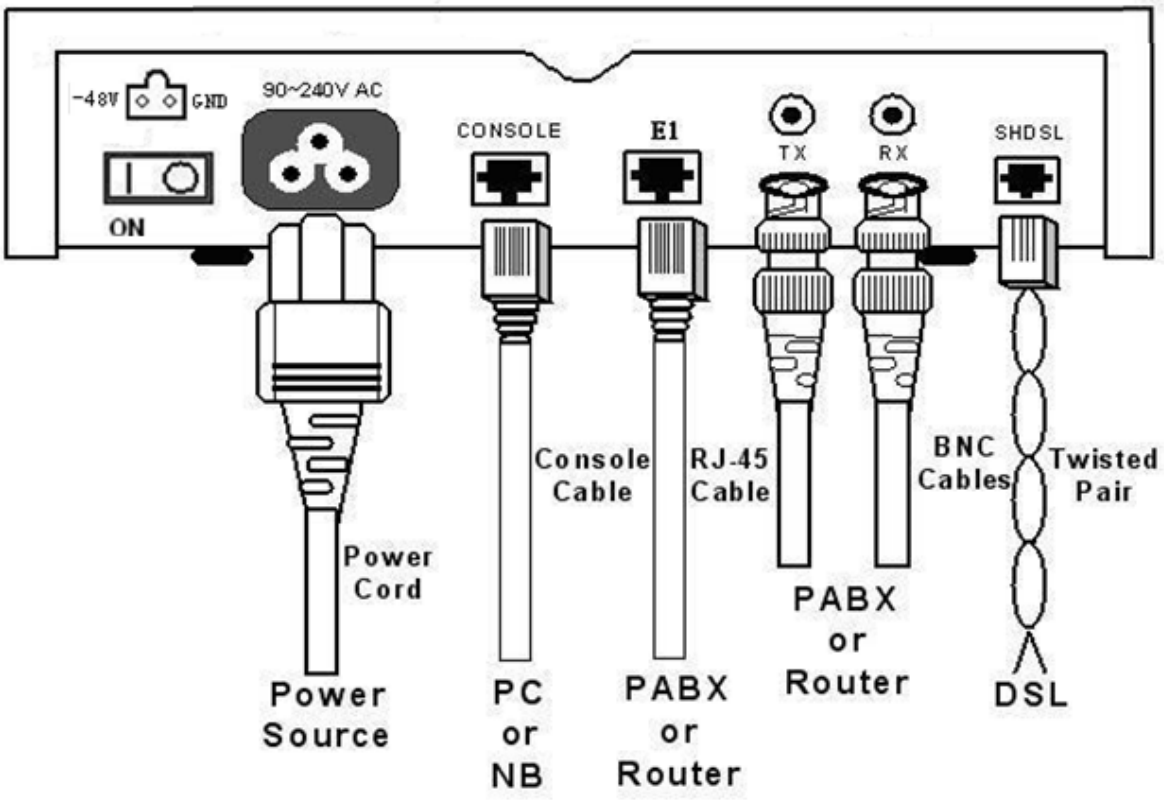
Note: To avoid possible damage to this modem, do not turn on the product before hardware installation.

- ✓ Plug the power cord in the power socket.
- ✓ Plug the console port in console if you want to configure the NTU with VT100 program of NB or PC.
- ✓ Plug the E1 cable (Either 75Ω BNC cables or 120Ω cable) / DATA cable / Ethernet cable
- ✓ Plug SHDSL cable
- ✓ Power on

Model	Interface modes support
E1 interface model	E1 interface
V.35 interface model	V.35 interface
Ethernet interface model	Ethernet interface

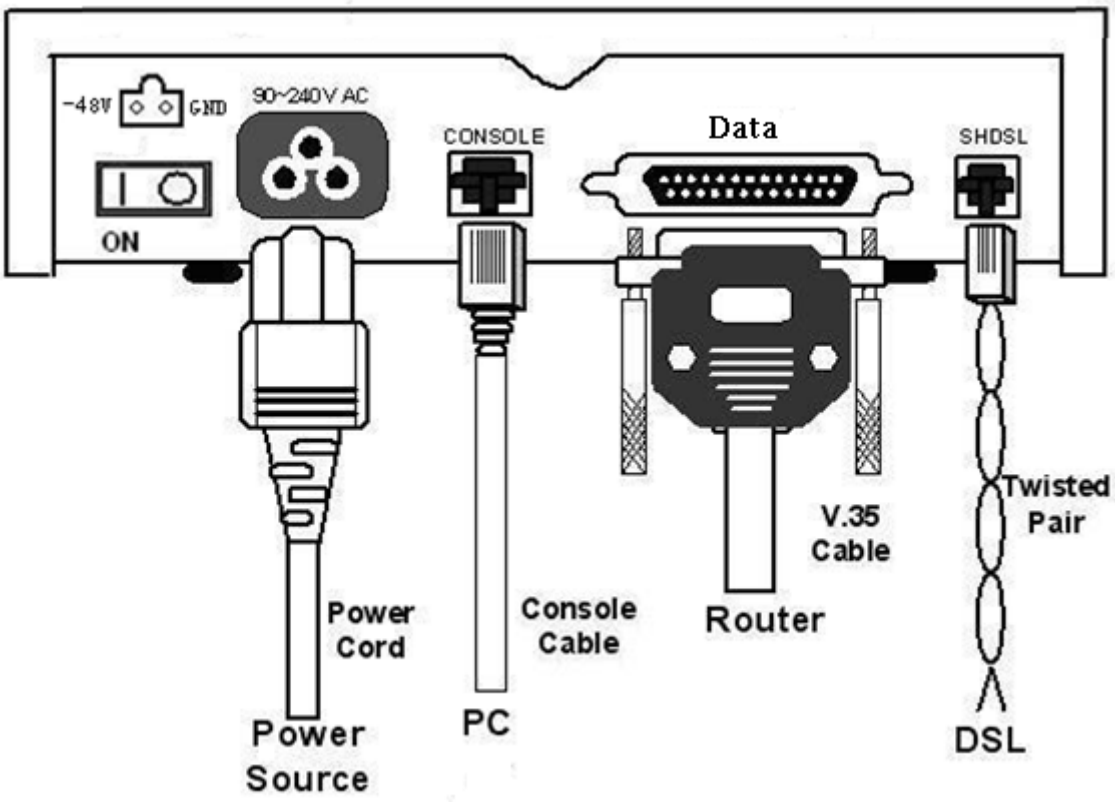
2.3.1 For E1 Interface

AC+DC power input version



2.3.2 For Data Interface

AC +DC power input version



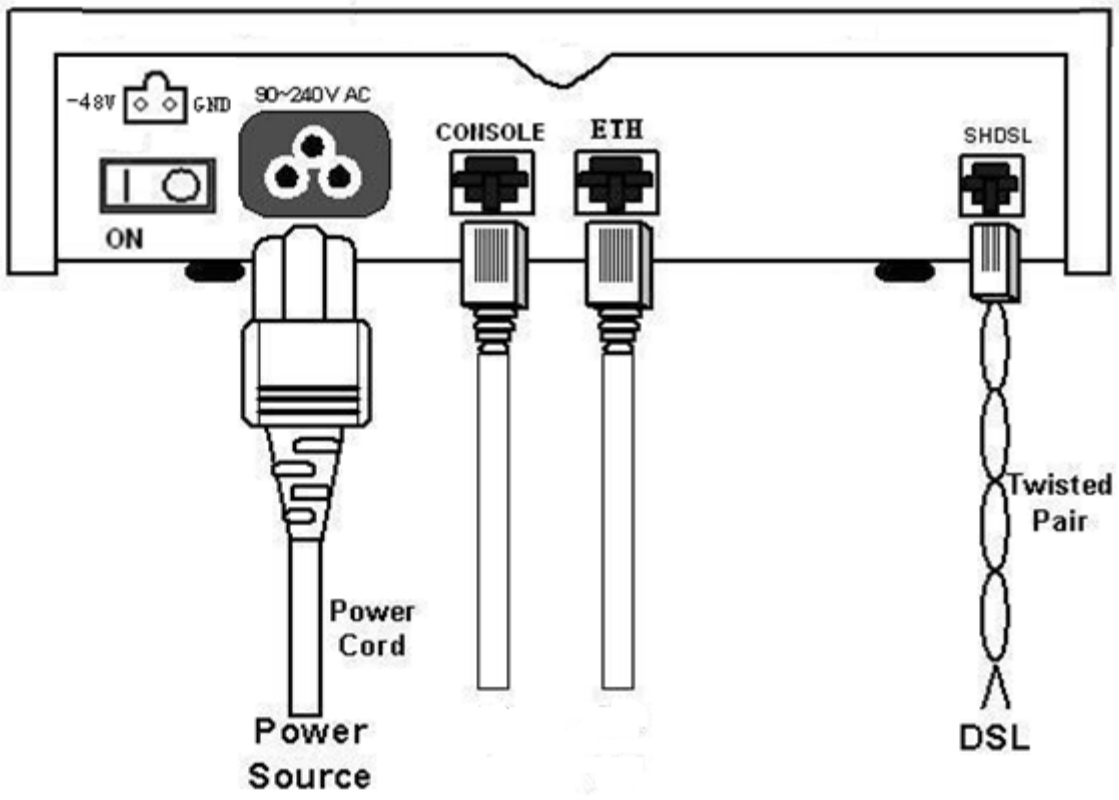
2.3.3 For Ethernet Interface

AC +DC power input version

earth:

The marked lug or terminal should be connected to the building protective earth bus.
The function of protective earth does not serve the purpose of providing protection against electrical shock, but instead enhances surge suppression on the DSL lines for installations where suitable bonding facilities exist.

The connector type is M3 machine screw.



Wetting Current:
Wetting current, also known as loop sealing current, is a low-level DC current applied to a loop for the specific purpose of maintaining cable splice integrity by preventing the build-up of oxidation. The modem has the ability to sink the source wetting current.

Warning! High Voltage. Do not open the housing.

2.4 CAUTION

CAUTION for accessibility
Be sure that the power outlet you plug the power card into is easily accessible and located as close as to the equipment operator as possible. When you need to disconnect power to the equipment, be sure to unplug the power card from the electrical outlet.

Warnings

- Do not use this product near water.
- Do not place this product on an unstable cart, stand or table. If the product falls, it could be seriously damaged.
- Slots and openings are provided for ventilation to ensure reliable operation of the product and to protect it from overheating. These openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, soft, rug or other similar surface. This product should never be placed near or over a radiator or heat register, or in a built-in installation unless proper ventilation is provided.
- Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind onto or into the product.

Using electrical power

- This product should be operated from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.
- Do not allow anything to rest on the power card. Do not locate this product where people will walk on the cord.
- If an extension cord is used with this product, make sure that the total ampere rating of the equipment plugged into the extension cord does not exceed the extension card ampere rating. Also, make sure that the total rating of all products plugged into the wall outlet does not exceed the fuse rating.
- Do not overload a power outlet, strip or receptacle by plugging in too many devices. The overall system load must not exceed 80% of the branch circuit rating. If power strips are used, the load should not exceed 80% of the power strip's input rating.
- The product's power supply is equipped with a three-wire grounding plug. The plug only fits in a grounded power outlet. Make sure the power outlet is properly grounded before inserting the power supply plug. Do not insert the plug into a non-grounded power outlet. Contact your electrician for details.

Warning! The grounding pin is a safety feature. Using a power outlet that is not properly grounded may result in electric shock and/or injury.

Note: The grounding pin also provides good protection from unexpected noise produced by other nearby electrical devices that may interfere with the performance of this product.

Product servicing
Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous voltage points or other risks, Refer all servicing to qualified service personnel.

- Unplug this product from the wall outlet and refer servicing to qualified service personnel when:
- The power card or plug is damaged, cut or frayed
- Liquid was spilled into the product
- The product was exposed to rain or water
- The product has been dropped or the case has been damaged
- The product exhibits a distinct change in performance, indicating a need for service
- The product does not operate normally after following the operating instructions

Note: Adjust only those controls that are covered by the operating instructions, since improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal condition.

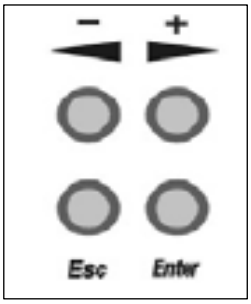
Disposal instructions
Do not throw this electronic device into the trash when discarding.
To minimize pollution and ensure utmost protection of the global environment, please recycle.

3 Configuring with Keypad and LCD

This chapter provides information on how to configure your G.SHDSL NTU via front panel LCD display and keypads.

3.1 Key Pads

The G.SHDSL NTU is designed by user-friendly configuration and management can using keypads and LCD display on front panel only without computer with VT100 terminal software.



Key Pad	Description
Esc	Return to previous configuration menu.
Enter	Skip to next configuration menu or configure this item.
-	Select other parameter in the same level menu.
+	Select other parameter in the same level menu.

3.2 Main menu Tree

After turning on G.SHDSL NTU, the LCD display will prompt “SHDSL NTU” and its interface mode. Press ***Enter*** key to enter. Sub-menus will display as follows:

E1 interface model:

SHDSL NTU ======E1======

SHOW STATUS
SHOW STATISTICS
SYSTEM SETUP
REBOOT SYSTEM
SYSTEM DIAGNOSTIC

Data interface model:

SHDSL NTU ====Data====

SHOW STATUS
SHOW STATISTICS
SYSTEM SETUP
REBOOT SYSTEM
SYSTEM DIAGNOSTIC

Ethernet interface model:

SHDSL NTU ===ETHERNET===

SHOW STATUS
SHOW STATISTICS
SYSTEM SETUP
REBOOT SYSTEM

3.3 Menu tree for [SHOW STATUS]

You can check status via LCD display.

SHOW STATUS

E1 interface model:

STATUS INTERFACE ,
STATUS SHDSL
STATUS E1
STATUS Code Version

.

V.35 interface model:

STATUS INTERFACE ,
STATUS SHDSL
STATUS Data
STATUS Code Version.

Ethernet interface model:

STATUS INTERFACE ,
STATUS SHDSL
STATUS ETHERNET
STATUS Code Version.

The other menu trees are as follows:

SHOW STATUS > STATUS INTERFACE

STATUS INTERFACE

* INTERFACE*

SHOW STATUS > STATUS SHDSL

STATUS SHDSL

* MODE *
* ANNEX *
* LINE RATE *
* ATTENUATION *
* SNR MARGIN *
* TX POWER *

SHOW STATUS > STATUS E1

STATUS E1

* SIGNAL FRAME *
* LINE CODE *
* CHANNEL *
* SLOT NUMBER *
* FIRST SLOT *
* AIS ALARM *
* BUILD OUTS *

SHOW STATUS > STATUS Data

STATUS Data

* INTERFACE *
* DATA RATE *
* CLOCK *
* Data RTS *
* DATA CTS *
* DATA DTR *
* DATA DSR *
* DATA DCD *
* RTS/CTS DELAY *

SHOW STATUS > STATUS ETHERNET

STATUS ETHERNET

LINK SPEED
OPERATION
RATE

SHOW STATUS > STATUS CODE VERSION

STATUS CODE VERSION

KERNEL FPGA

3.4 Menu tree for [SHOW STATISTICS]

The product can display two kinds of statistics data:

SHDSL statistics data [ES, SES, UAS and LOWS]
Show the current 15 minutes period and 96 previous 15-minutes period of SHDSL performance.
Show the current 24 hours period and 7 previous 24-hours periods of SHDSL performance.

SHDSL
ES
SES
UAS
LOSW

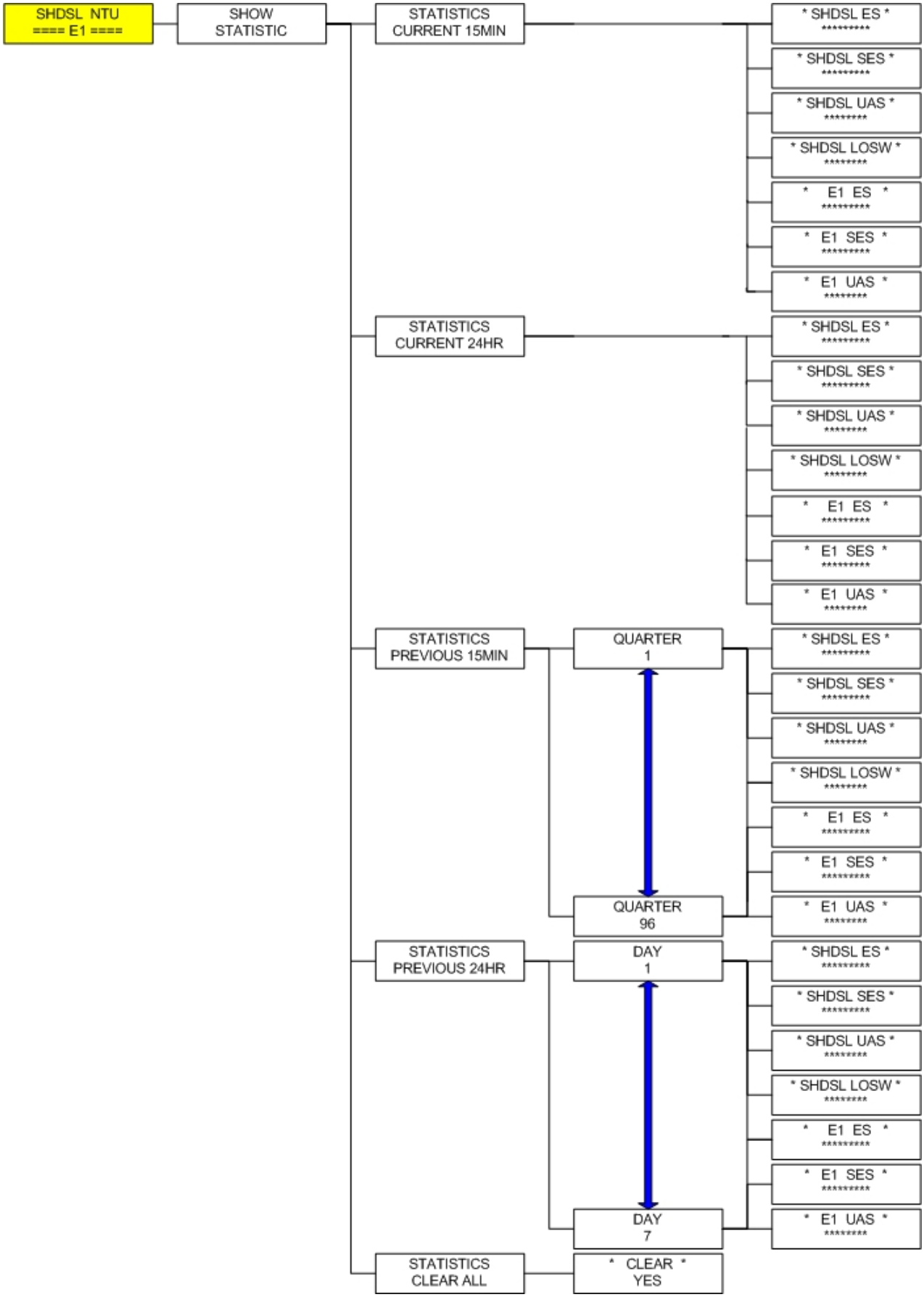
E1 statistics data [ES, SES and UAS] (E1 model ONLY)
Show the current 15 minutes period and 96 previous 15-minutes period of E1 performance.
Show the current 24 hours period and 7 previous 24-hours periods of E1 performance.

E1
ES
SES
UAS

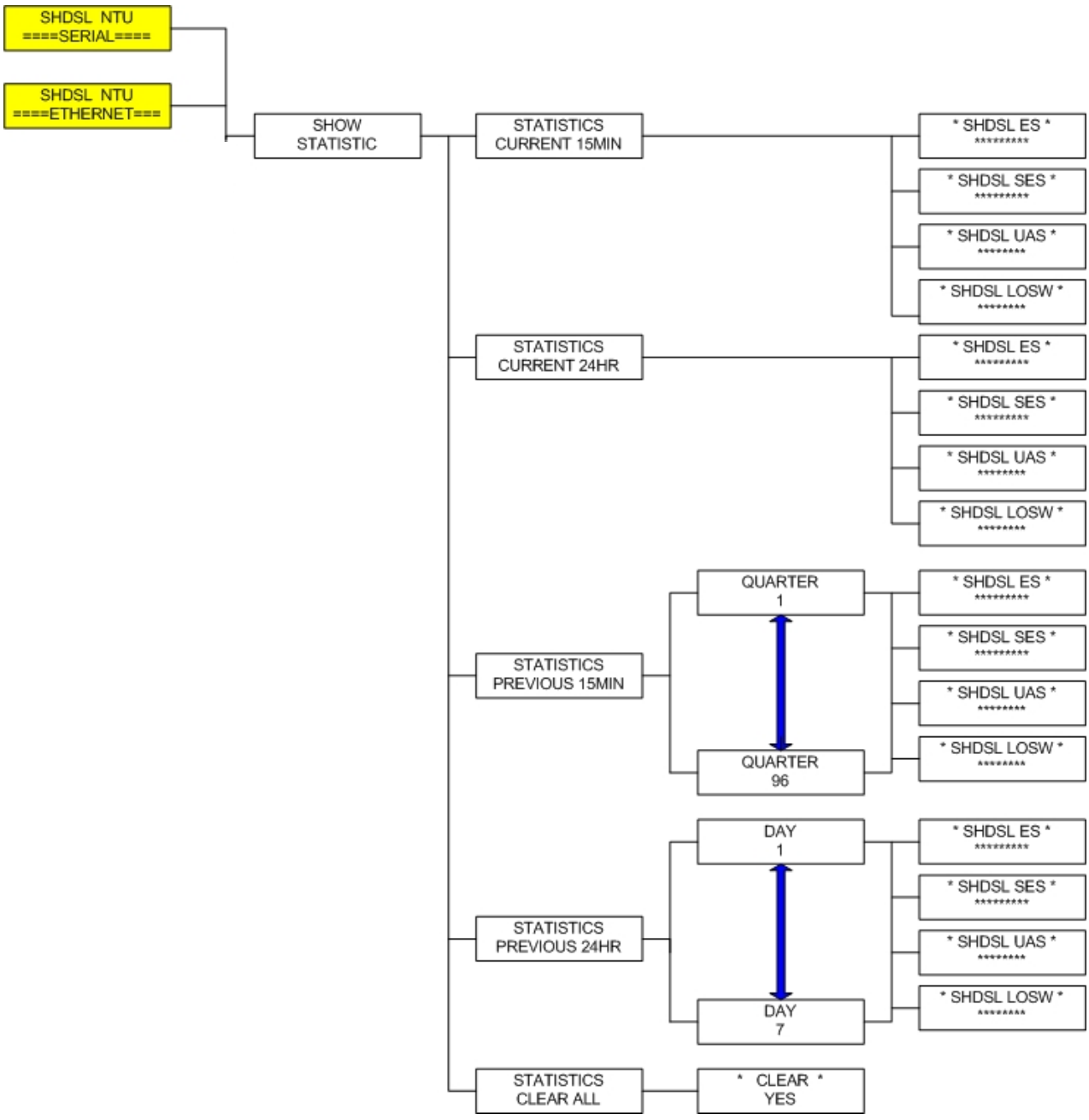
Abbreviation:

ES	Error Second
SES	Severely Error Second
UAS	Unavailable Second
LOWS	Loss of Synchronization word

E1 Interface



Data Interface
Ethernet Interface



3.5 Menu tree for [SYSTEM SETUP]

You can check system setup type via LCD display.

SYSTEM SETUP

E1 interface model:

SETUP INTERFACE ,
SETUP SHDSL
SETUP E1
SETUP ALLOW RMT CONFIG
SETUP DEFAULT
SETUP REMOTE CONFIG

V.35 interface model:

SETUP INTERFACE ,
SETUP SHDSL
SETUP DATA
SETUP ALLOW RMT CONFIG
SETUP DEFAULT
SETUP REMOTE CONFIG

Ethernet interface model:

SETUP INTERFACE ,
SETUP SHDSL
SETUP ETHERNET
SETUP ALLOW RMT CONFIG
SETUP DEFAULT
SETUP REMOTE CONFIG

SYSTEM SETUP > SETUP INTERFACE

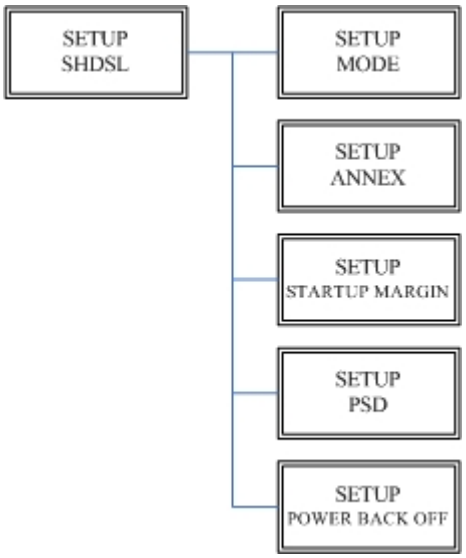
SETUP INTERFACE

	Selection items
SETUP INTERFACE	E1, DATA, ETHERNET

Model	Interface modes support
E1 interface model	E1
Data interface model	Data
Ethernet interface model	Ethernet

SYSTEM SETUP > SETUP SHDSL

SETUP SHDSL



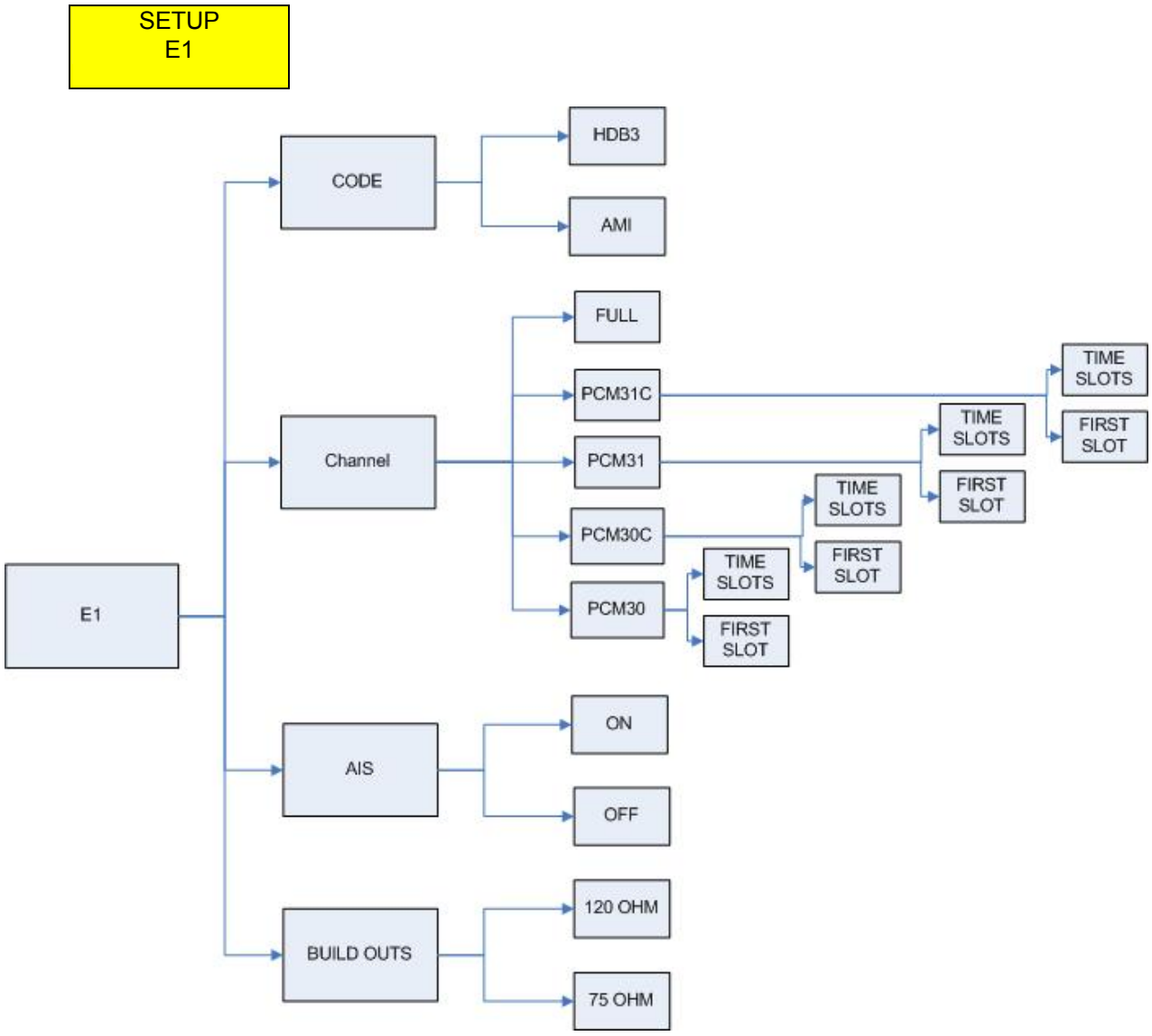
SETUP SHDSL	Selection items
SETUP MODE	STU-R, STU-C-INTCLK, STU-C-EXTCLK
SETUP ANNEX	A, B
SETUP STARTUP MARGIN	DISABLE , 0 to 10
SETUP PSD	R1_ASTM, R2_ASYM, SYM_ENABLE, ASYM_DISBALE
SETUP POWER BACK OFF	Disable, Enable

The following are commonly used acronyms for **SETUP MODE**:

STU-R	RT side, where the clock source is set to external
STU-C-INTCLK	CO side, where the clock source is set to internal
STU-C-EXTCLK	CO side, where the clock source is set to external

3.5.1 Sub-Menu tree for SETUP E1 Interface

SYSTEM SETUP ➔ SETUP E1



E1 parameter setting:

E1 Items	Setting
Channel	FULL PCM31 PCM31C PCM30 PCM30C
Code	HDB3 AMI
AIS	On Off
Build Outs	120 ohms 75 ohms

E1 Framer Setting:

Framer		Slot Number	First Slot
PCM31	FAS	1 to 31	1 to 31
PCM31C	FAS+CRC4	1 to 31	1 to 31
PCM30	FAS+CAS	1 to 30	1 to 31 (can't use 16)
PCM30C	FAS+CAS+CRC4	1 to 30	1 to 31 (can't use 16)
FULL	UNFRAMED		

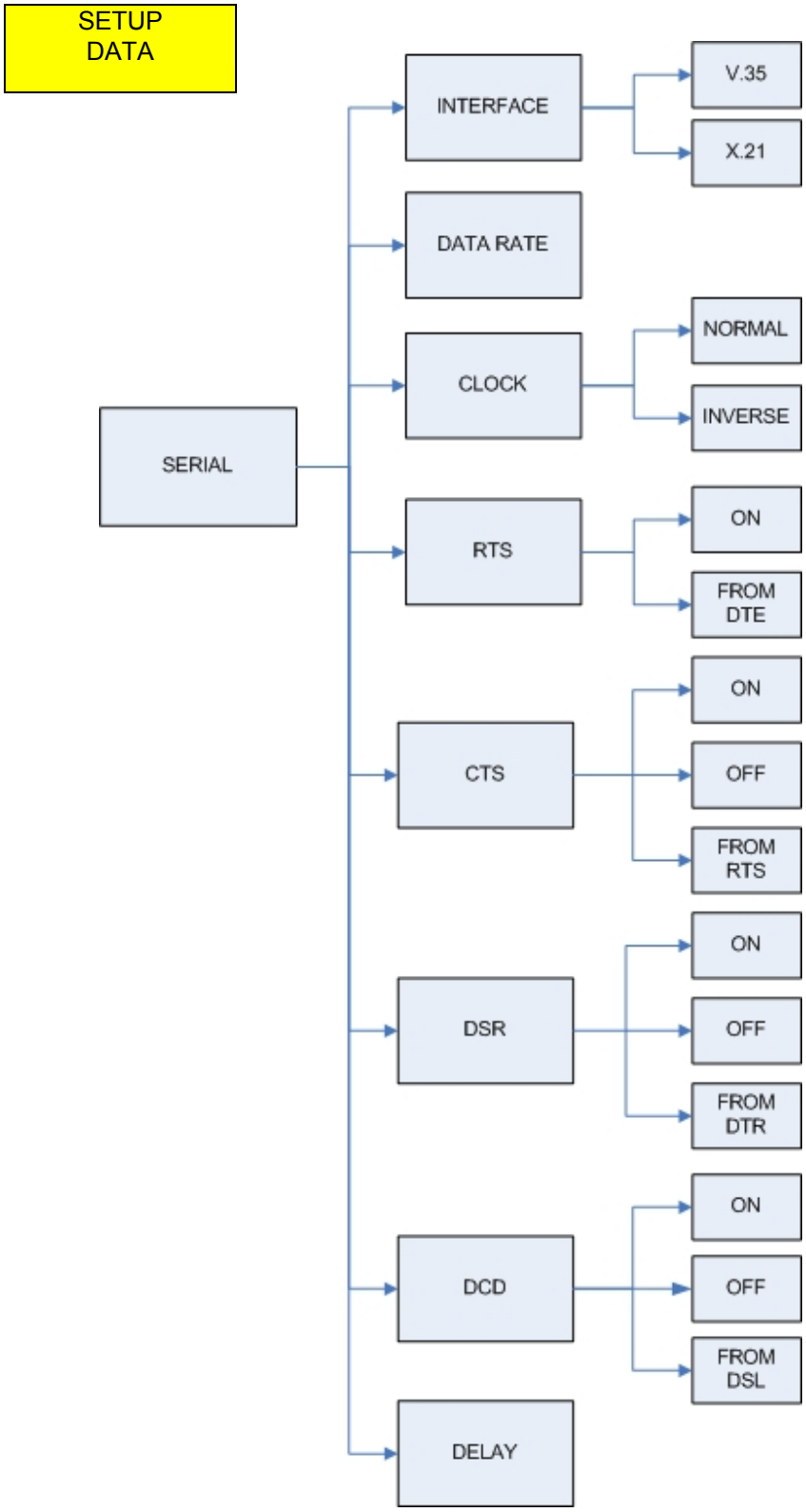
Table of number of slots and their first time slot:

Channel	Number of slots	1st slot
FULL (UNFRAMED)	-----	-----
PCM31 PCM31C	31	1
	30	1~2
	29	1~3
	28	1~4
	27	1~5
	26	1~6
	25	1~7
	24	1~8
	23	1~9
	22	1~10
	21	1~11
	20	1~12
	19	1~13
	18	1~14
	17	1~15
	16	1~16
	15	1~17
	14	1~18
	13	1~19
	12	1~20
	11	1~21
	10	1~22
	9	1~23
	8	1~24
	7	1~25
	6	1~26
	5	1~27
	4	1~28
	3	1~29
	2	1~30
	1	1~31

PCM30 PCM30C	30	1
	29	1~2
	28	1~3
	27	1~4
	26	1~5
	25	1~6
	24	1~7
	23	1~8
	22	1~9
	21	1~10
	20	1~11
	19	1~12
	18	1~13
	17	1~14
	16	1~15
	15	1~15,17
	14	1~15,17~18
	13	1~15,17~19
	12	1~15,17~20
	11	1~15,17~21
	10	1~15,17~22
	9	1~15,17~23
	8	1~15,17~24
	7	1~15,17~25
	6	1~15,17~26
	5	1~15,17~27
	4	1~15,17~28
	3	1~15,17~29
	2	1~15,17~30
	1	1~15,17~31

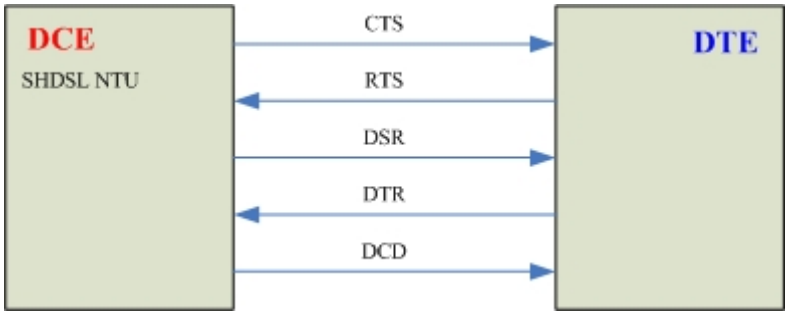
3.5.2 Sub-Menu tree for SETUP SERIAL Interface

SYSTEM SETUP ➔ SETUP SERIAL

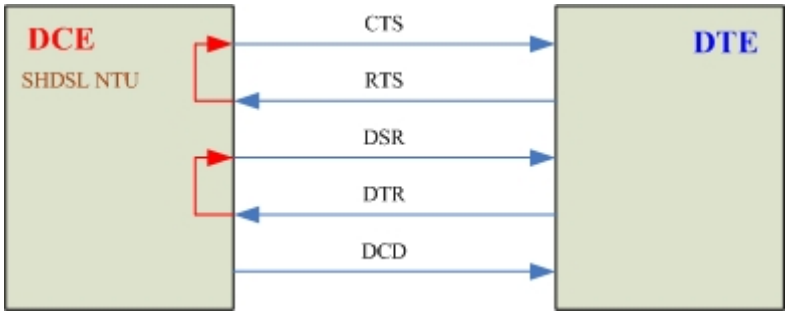


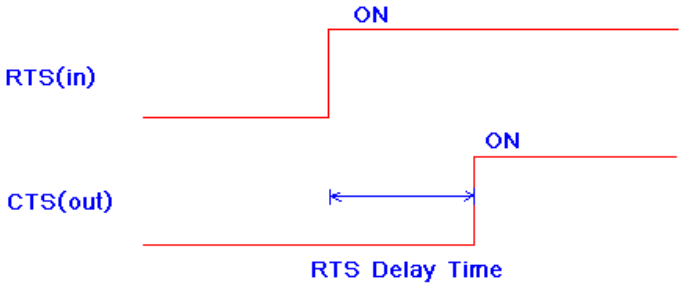
Data Items	Setting
INTERFACE	V.35 X.21(RS-530)
Nx64K (Rate)	1 ~ 36
CLOCK	Normal Inverse
RTS	On From DTE
CTS	On Off From RTS
DSR	On Off From DTR
DCD	On Off From DSL
DELAY	0mS 1mS 2mS 3mS

The handshake signal direction between DCE and DTE



The below diagram shows CTS follow RTS, DSR follow DTR



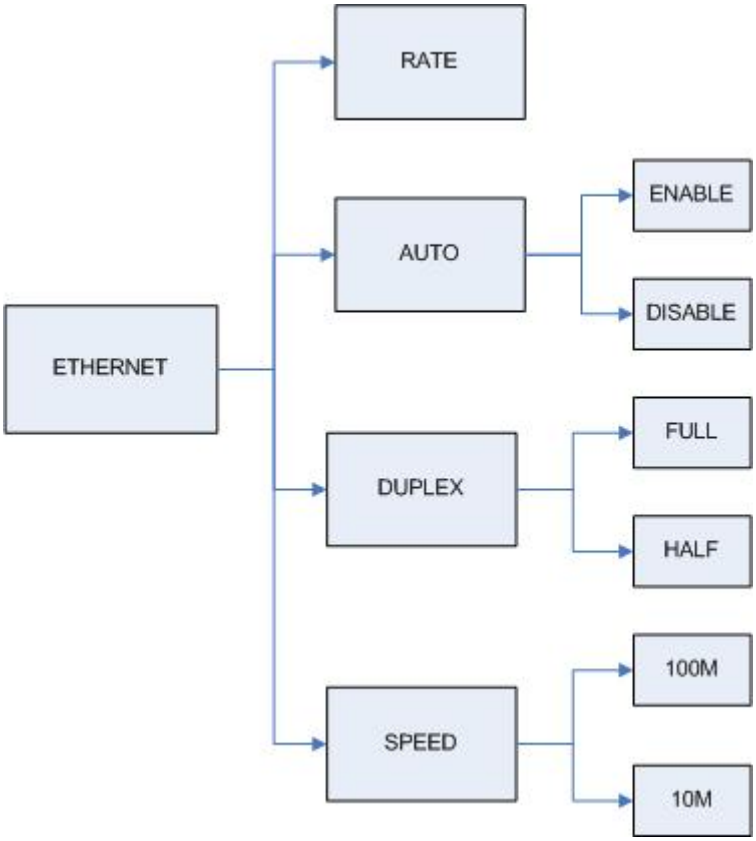


The RTS delay time is use to control CTS on delay to RTS signal, It is work only for the setting:
CTS follow RTS and *RTS follow from DTE*

3.5.3 Sub-Menu tree for SETUP Ethernet Interface

SYSTEM SETUP ➔ SET UP ETHERNET

SETUP ETHERNET



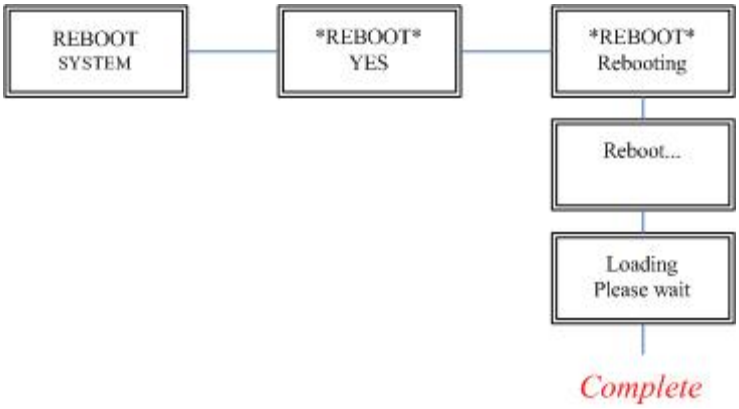
If you set Ethernet **Auto** Negotiation as Enable, the **Duplex** and **Speed** can't be set up and instead will auto configure.

Ethernet Items	Setting	
Rate	1 ~ 36	
Auto	Disable	Enable
Duplex	Full-Duplex Half-Duplex	Auto Configuration
Speed	100M 10M	Auto Configuration

3.6 Menu tree for [REBOOT SYSTEM]

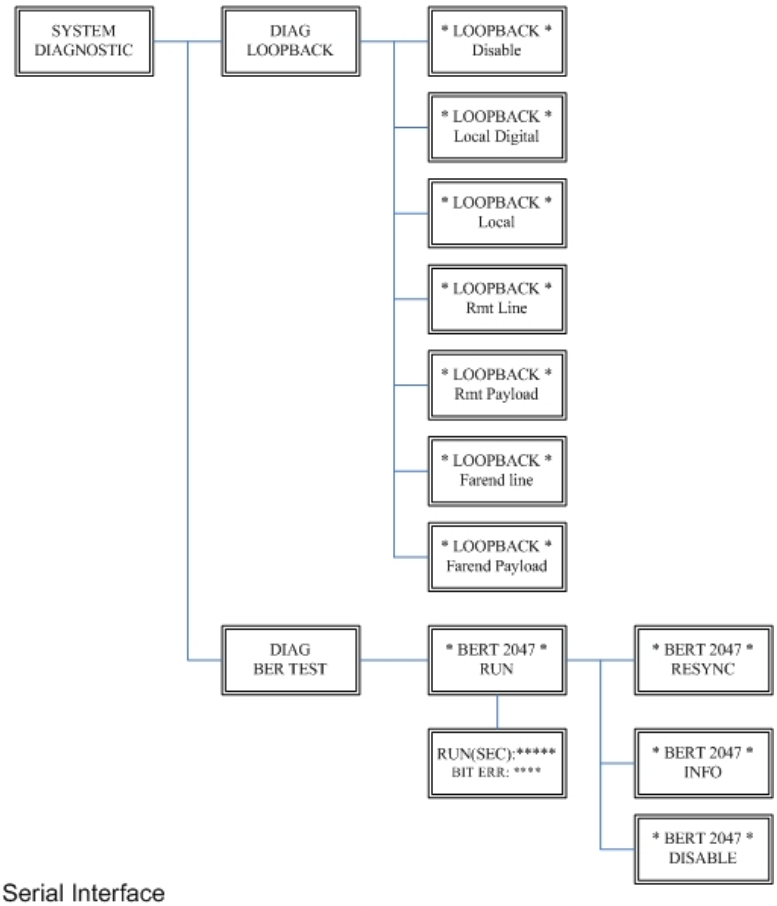
REBOOT SYSTEM

To use the REBOOT SYSTEM command, press “ENTER” Key; select ”YES” and press ”ENTER” Key again. You can see the “Reboot…” display. It will return to main menu after the reboot operation is finish.

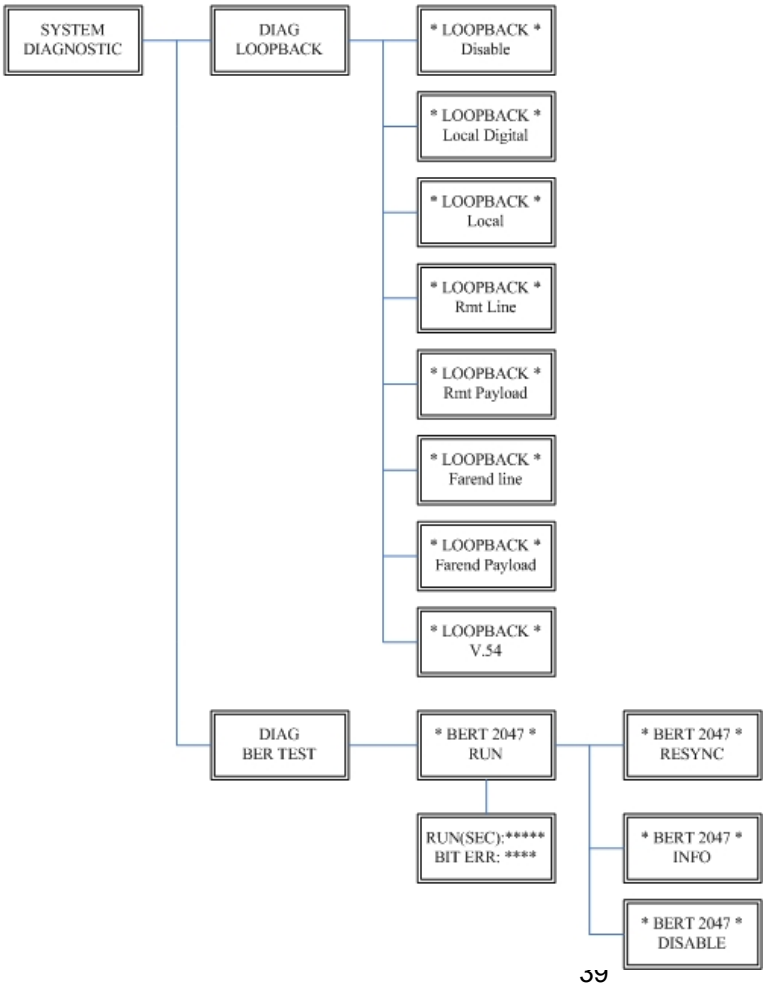


3.7 Menu tree for [SYSTEM DIAGNOSTIC]

E1 Interface


SYSTEM DIAGNOSTIC
DIAG LOOPBACK
* LOOPBACK * Disable
* LOOPBACK * Local Digital
* LOOPBACK * Local
* LOOPBACK * Rmt Line
* LOOPBACK * Rmt Payload
* LOOPBACK * Farend line
* LOOPBACK * Farend Payload
DIAG BER TEST
* BERT 2047 * RUN
* BERT 2047 * RESYNC
RUN(SEC):***** BIT ERR: ****
* BERT 2047 * INFO
* BERT 2047 * DISABLE

Serial Interface


SYSTEM DIAGNOSTIC
DIAG LOOPBACK
* LOOPBACK * Disable
* LOOPBACK * Local Digital
* LOOPBACK * Local
* LOOPBACK * Rmt Line
* LOOPBACK * Rmt Payload
* LOOPBACK * Farend line
* LOOPBACK * Farend Payload
* LOOPBACK * V.54
DIAG BER TEST
* BERT 2047 * RUN
* BERT 2047 * RESYNC
RUN(SEC):***** BIT ERR: ****
* BERT 2047 * INFO
* BERT 2047 * DISABLE

SYSTEM
DIAGNOSTIC

System Diagnostic has two functions: Loopback test and BER test.

SYSTEM DIAGNOSTIC ➔ DIAG LOOPBACK

DIAG
LOOPBACK

SYSTEM DIAGNOSTIC ➔ DIAG BER TEST

DIAG
BER TEST

3.7.1 Loopback Test

Note : No SYSTEM DIAGNOSTIC menu is available on the Ethernet Interface Model

For E1 Interface model as CO side, there have: local digital, local, remote line, remote payload, farend line and farend payload.
For Data Interface model as CO side, there have: Local digital, local, remote line, remote payload, farend line, farend payload and V.54.
For E1 Interface model as CPE side, there have: local digital, remote line, remote payload, farend line and farend payload.
For Data Interface model as CPE side, there have: Local digital, remote line, remote payload, farend line, farend payload and V.54.

If the device hasn't connected or is still under handshaking, there will not be any farend line, farend payload or V.54 loopback available.

Definition of ***V.54***
An ITU standard (1976) for various loopback tests that can be incorporated into modems for testing the telephone circuit and isolating transmission problems.
Operating modes include local and remote digital loopback and local and remote analog loopback.

Stand alone NTU, no connection with other NTU:

E1 interface CO side
Local digital
Local
Remote line
Remote payload

Data interface CO side
Local digital
Local
Remote line
Remote payload

E1 interface CPE side
Local digital
Remote line
Remote payload

Data interface CPE side
Local digital
Remote line
Remote payload

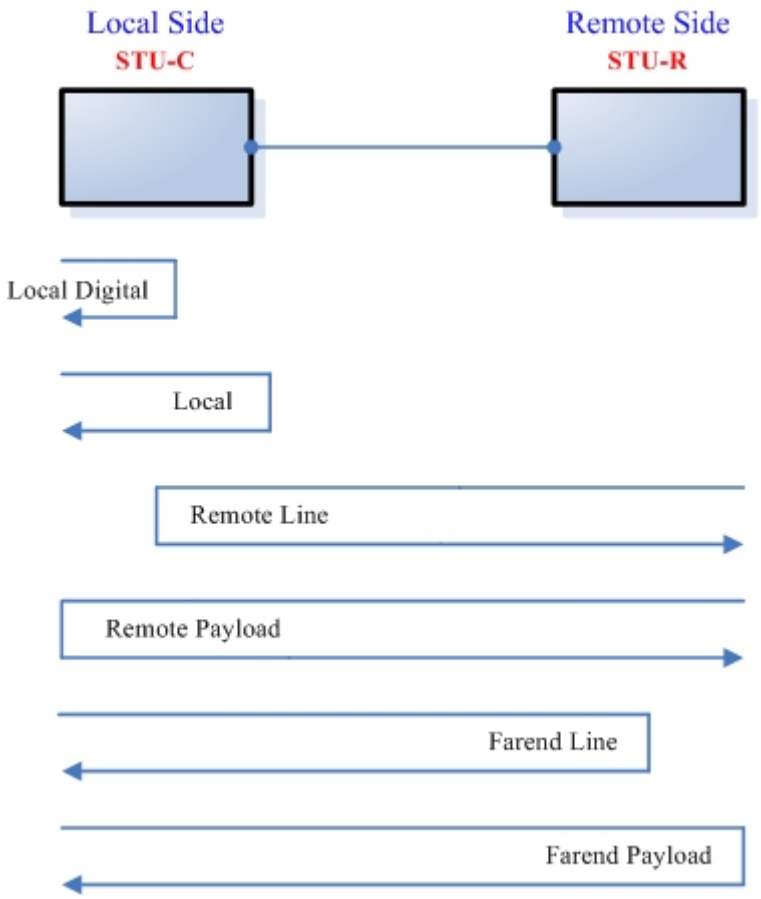
After connection both CO side and CPE side:

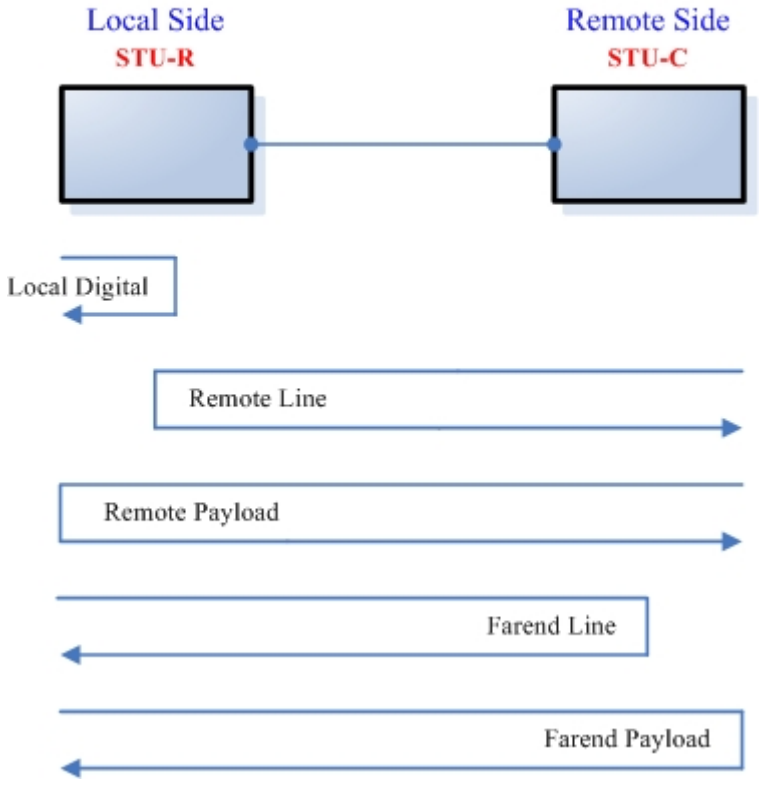
E1 interface CO side
Local digital
Local
Remote line
Remote payload
Farend line
Farend payload

Data interface CO side
Local digital
Local
Remote line
Remote payload
Farend line
Farend payload
V.54

E1 interface CPE side
Local digital
Remote line
Remote payload
Farend line
Farend payload

Data interface CPE side
Local digital
Remote line
Remote payload
Farend line
Farend payload
V.54


Local Side
STU-C
Remote Side
STU-R
Local Digital
Local
Remote Line
Remote Payload
Farend Line
Farend Payload


Local Side
STU-R
Remote Side
STU-C
Local Digital
Remote Line
Remote Payload
Farend Line
Farend Payload

3.7.2 BER Test

This function provides the internal Bit Error Rate Tester (BERT) for complete testing of local and remote modem and the link quality without any external test equipment.
This built-in Bit Error Rate Test generator can generates a standard 2047 (2^{11}-1) test pattern.

DIAG BER TEST

BERT 2047 RUN

When the BERT has no Bit Errors, it shows zero. Otherwise, it will show some counter number.
RUN(SEC) item shows the time elapsed second count.

RUN(SEC): 00001 BIT ERR: 00000

If the NO SYNC on bit error message shows, it means the testing paths haven't connected.

RUN(SEC): 00001 BIT ERR: NO SYNC

Press ENTER key on this display message, and it will try to re-sync again.

BERT 2047 RESYNC

Press ENTER key on this display message, and it will show the test in real time.

BERT 2047 INFO

If you want to exit the BERT, you can press the ENTER key from this display message.

BERT 2047 DISABLE

3.8 Parameters Table

3.8.1 E1 Interface Model

NTU	Type	☐STU-R ☐STU-C-INTCLK ☐STU-C-EXTCLK
SHDSL	Annex	☐A ☐B
	PSD	☐R1_ASTM ☐R2_ASYM ☐SYM_ENABLE ☐ASYM_DISABLE
	SNR Margin	☐DISABLE ☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10
	Power Back Off	☐Disable ☐Enable
E1	Channel	☐PCM31 ☐PCM31C ☐PCM30 ☐PCM30C ☐Unframed
	Slot Number	
	First Slot	
	Code	☐HDB3 ☐AMI
	AIS	☐Off ☐On
	Build Outs	☐75 Ohm ☐120 Ohm

3.8.2 Data Interface Model

NTU	Type	☐STU-R ☐STU-C-INTCLK ☐STU-C-EXTCLK
SHDSL	Annex	☐A ☐B
	PSD	☐R1_ASTM ☐R2_ASYM ☐SYM_ENABLE ☐ASYM_DISABLE
	SNR Margin	☐DISABLE ☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10
	Power Back Off	☐Disable ☐Enable
Data	Interface	☐V.35 ☐X.21
	Data Rate	
	Clock	☐Normal ☐Inverse
	RTS	☐On ☐From DTE
	CTS	☐On ☐Off ☐From RTS
	DSR	☐On ☐Off ☐From DTR
	DCD	☐On ☐Off ☐From DSL
	Delay	☐0mS ☐1mS ☐2mS ☐3mS

3.8.3 Ethernet Interface model

NTU	Type	☐STU-R ☐STU-C-INTCLK ☐STU-C-EXTCLK
SHDSL	Annex	☐A ☐B
	PSD	☐R1_ASTM ☐R2_ASYM ☐SYM_ENABLE ☐ASYM_DISABLE
	SNR Margin	☐DISABLE ☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10
	Power Back Off	☐Disable ☐Enable
Ethernet	Date Rate	
	Auto Config	☐Disable ☐Enable
	Speed	☐Full ☐Half
	Duplex	☐100M ☐10M

4 Configuration with Console Port

This chapter will deal with the specifics of configuration and operation of this product via console port with a terminal emulation program. The configuration of G.SHDSL NTU is performed via a menu-driven embedded software, using a standard ASCII terminal or a PC running a terminal emulation application connected to the rear panel CONSOLE port.
Windows includes a terminal emulation program called HyperTerminal. Since Microsoft discontinued including HyperTerminal from the introduction of Vista OS, search and download an alternate emulator such as "TeraTerm" or "PuTTY". Connect the appropriate communication port from the PC to this device using the cable provided with this modem. After the physical connection is made, you are ready to configure this product. Make sure you have connected the supplied RS-232C Data cable (DB9F to RJ-45 Plug) to the console port on the rear panel on this product.
Run the terminal emulation program such as Hyper Terminal with the following setting:
Emulation: VT-100 compatible
Band rate: 115200, Data bits: 8, Parity: None, Stop Bits:1 , Flow Control: None

4.1 Login Procedure

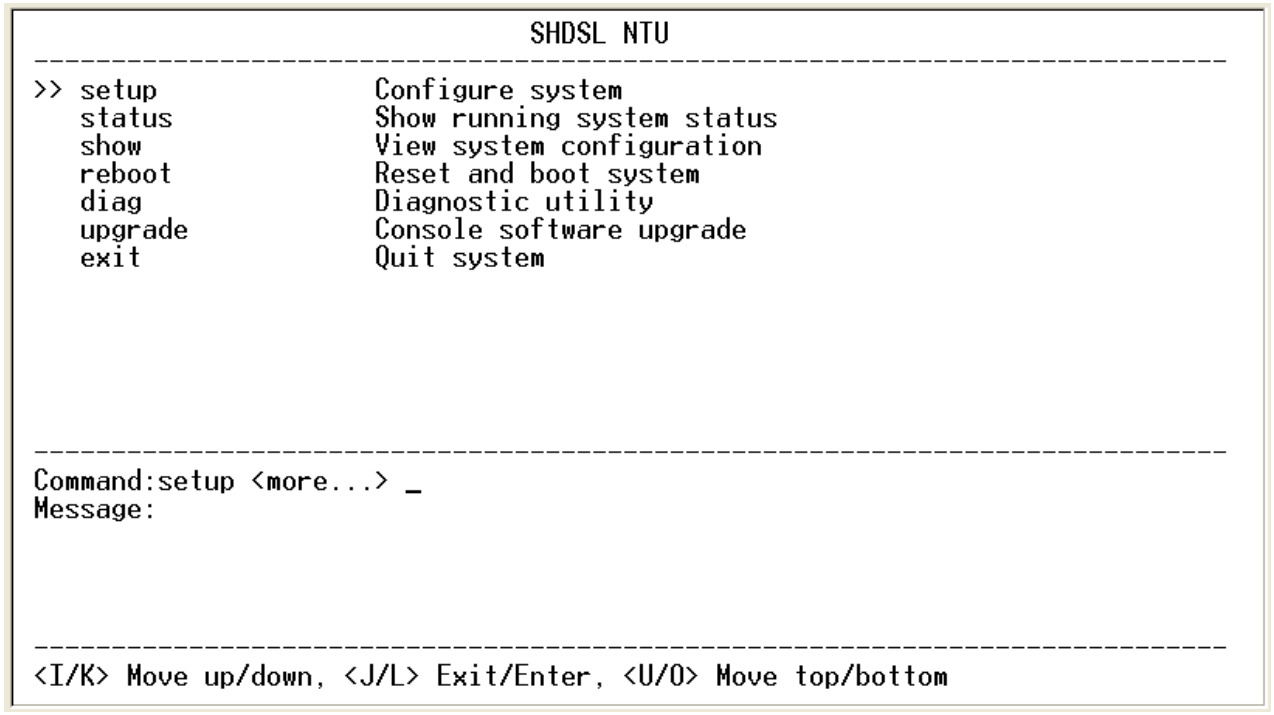
At the start up screen, you will see:

DownLoad FPGA Code 000111ad/000111ad...Ok
SHDSL (Ethernet) Interface, STU_C_INTCLK Mode
Model = 5030G V2 Software Version = 1.03.20 FPGA Version = 1.02
MCSV 1536-0000-10193BB4 / 1536-0000-103C38F9
Press SPACE key to enter console mode configuration!

Press the SPACE key until the login screen appears. When you see the login screen, you can logon to device. Username use “**admin**”. When the system prompts you for a password, type “**admin**” to enter is O.K.

4.2 Window structure

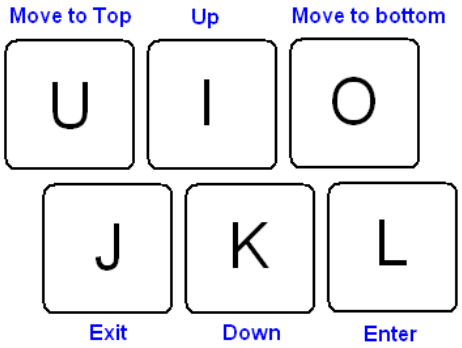
After you type the password, the main menu will display.



Above screen capture shows the common structure for all windows used throughout the configuration console terminal.
From top to bottom, the window is divided into four major sections.
The very top line displays the product name.
Next a block of commands is listed where the ">>" symbol indicates the current cursor placeholder.
The next block down is the "command" section. The command that is selected and ready for execution is displayed after the "Command:" prompt. The "<more…> designation indicates that there are other sub menus to this command. The "Message:" field is used to display any special system messages or warnings.
Finally, at the very bottom of the screen is a help command line and reminder of the currently available command keys. In most cases, the keyboards four cursor keys can be used to navigate all the menu system. If for some reason your keyboard's cursor keys are not supported in the terminal emulation software, you may uses the keys listed on the help command line.

4.3 Menu Commands

Before changing the configuration, familiarize yourself with the operations list in the following table. The operation list will be shown on the window.



Keypads	Description
[UP] or **I**	Move to above field in the same level menu
[DOWN] or **K**	Move to below field in the same lever menu
U	Move to top field in the same level menu
O	Move to bottom field in the same level menu
[LEFT] or **J**	Move back to previous menu (Exit)
[RIGHT] , **L** or [ENTER]	Move forward to submenu(Enter)
[TAB]	To choose another parameters
Ctrl + C	To quit the show data display screen

Note: In most cases, the cursor keys on a full sized keyboard will also work to navigate the menu system.

4.4 Main Menu Summary

The main menu is prompt as follow.

Menu Title	Function
Setup	To setup SHDSL type, SHDSL parameters and E1/Data/Ethernet parameters or restore factory default setting.
Status	To show SHDSL status, E1 /V.35/Ethernet status and statistics or clear the statistics on both local and remote side.
Show	To show general information, all configurations and all configurations in command script format.
Reboot	To reboot the system
Diag	To setup diagnostic utility
Upgrade	To upgrade firmware (kernel and FPGA code)
Exit	To exit this system

4.5 [Setup] Configuration

This section provides information about configuration the G.SHDSL NTU. Follow the procedures:
In main menu, select **setup** and press [ENTER] or [RIGHT]

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> setup               Configure system
   status              Show running system status
   show                View system configuration
   reboot              Reset and boot system
   diag                Diagnostic utility
   upgrade             Console software upgrade
   exit                Quit system









--------------------------------------------------------------------------------
Command:setup <more...> _
Message:




--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Press [ENTER] or [L] key to select which channel (Local side or Remote side).

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> LocCh               Setup Local  Channel
   RmtCh               Setup Remote Channel









--------------------------------------------------------------------------------
Command:LocCh <CR>
Message:




--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The screen will prompt as follows:

E1 interface model

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
   E1                 Configure E1 Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Interface <CR>
Message:




--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can see the E1 parameters that can be set.

Data interface model

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
   Serial             Configure Serial Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Interface <CR> _
Message:




--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can see Data parameters can be set.

Ethernet interface model

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
   Ethernet           Configure Ethernet Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Interface <CR> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can see Ethernet parameters can be set.

4.5.1 Configure Interface

Select **Interface** item, and press [ENTER] or [RIGHT] to setup NTU Interface.

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
   E1                 Configure E1 Parameters
   Ethernet           Configure Ethernet Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Interface <CR>
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

```
                                    SHDSL NTU
--------------------------------------------------------------------------------
>> Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
   E1                 Configure E1 Parameters
   Ethernet           Configure Ethernet Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Interface <CR>
Message: Please input the following information.

SHDSL Interface (TAB Select) <E1+Ethernet>: E1+Ethernet


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Press [TAB] to select the operating type and press enter to finish setting.

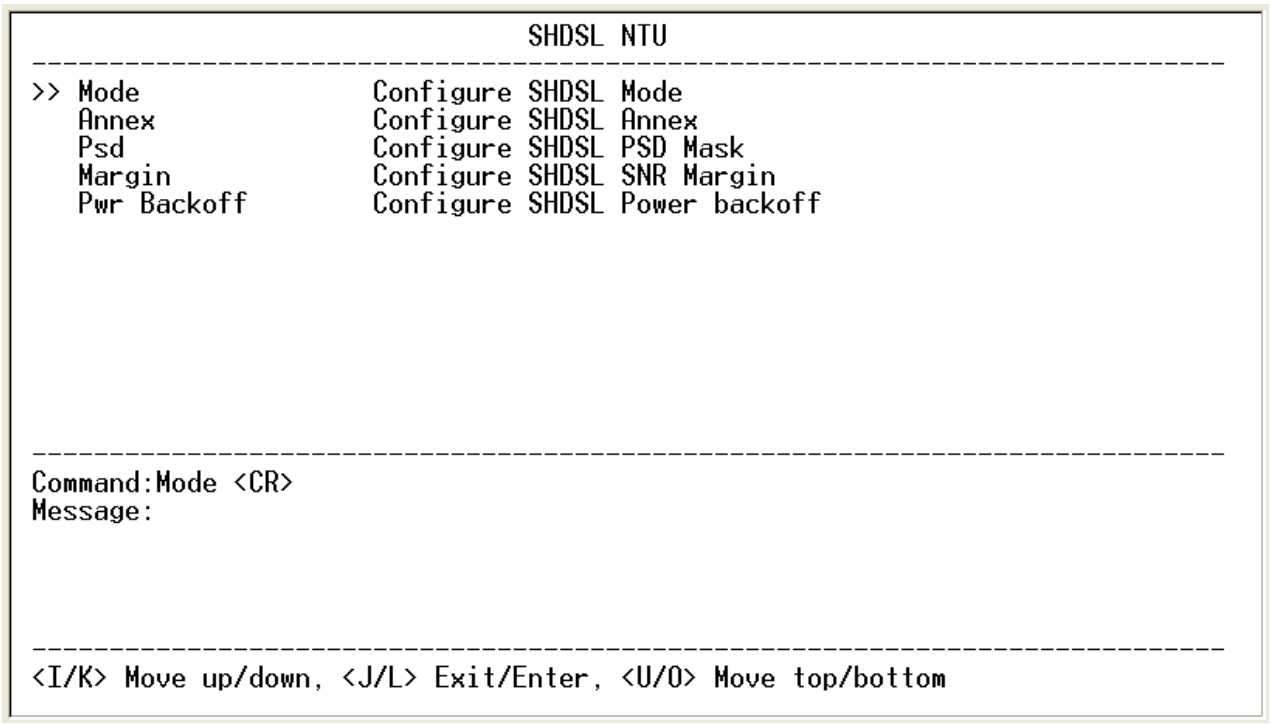
Model	Interface modes support
E1 interface model	E1
Data interface model	Data
Ethernet interface model	Ethernet

4.5.2 Configure SHDSL parameters

This section will introduce the configuration of SHDSL parameters.
Select **Shdsl ,** and press [ENTER] or [RIGHT].

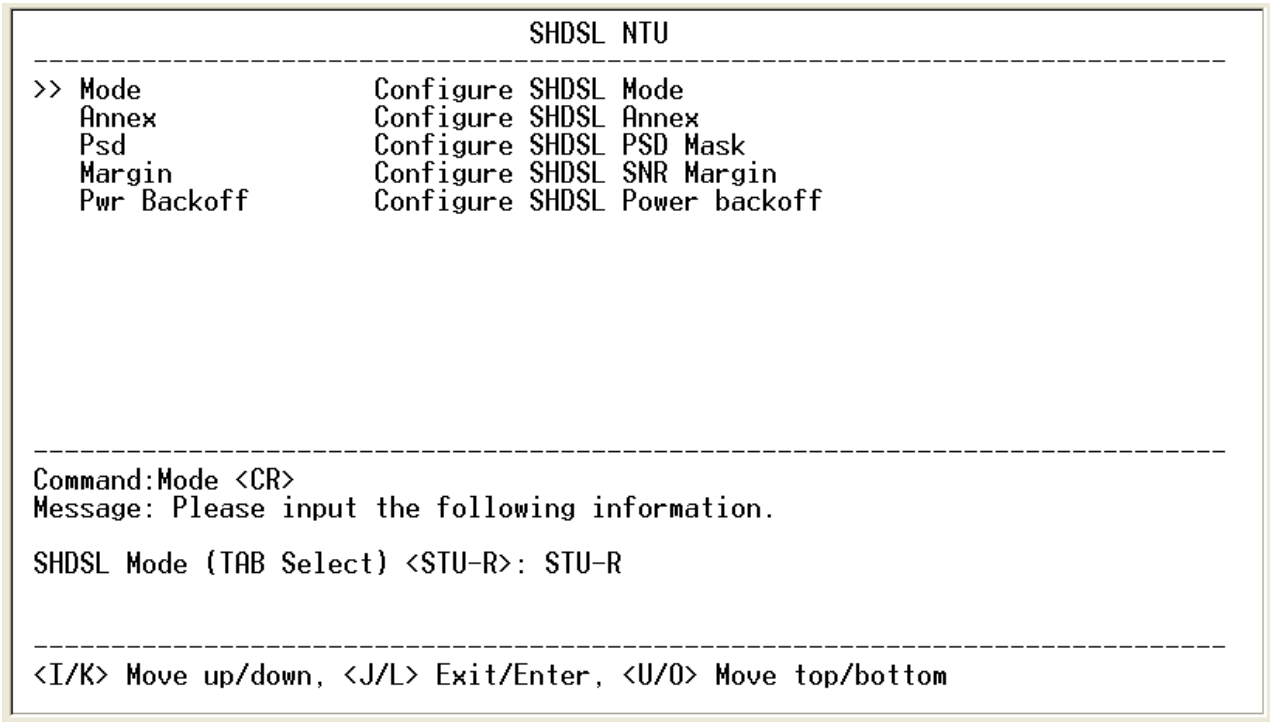
```
                                    SHDSL NTU
--------------------------------------------------------------------------------
   Interface          Configure NTU Interface
>> Shdsl              Configure SHSDL Parameters
   E1                 Configure E1 Parameters
   Ethernet           Configure Ethernet Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Shdsl <more...> _
Message:




--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The SHDSL parameters items include **SHDSL Mode**, **Annex type**, **PSD**, **SNR margin and Power backoff**.



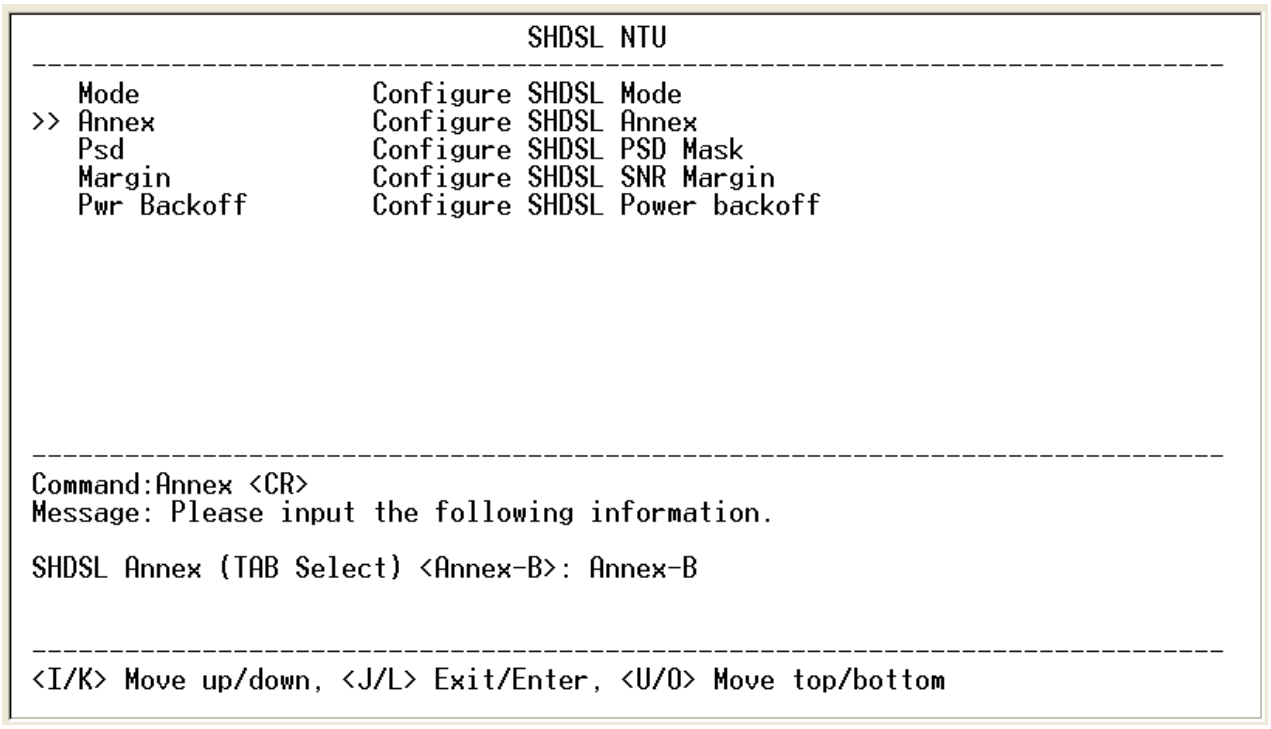
To configure SHDSL mode, move the cursor to **Mode** and press [ENTER] or [L]. Select the SHDSL mode by using the [TAB] key.

Setup SHDSL parameter, Mode


SHDSL NTU
>> Mode Configure SHDSL Mode
Annex Configure SHDSL Annex
Psd Configure SHDSL PSD Mask
Margin Configure SHDSL SNR Margin
Pwr Backoff Configure SHDSL Power backoff
Command:Mode <CR>
Message: Please input the following information.
SHDSL Mode (TAB Select) <STU-R>: STU-R
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

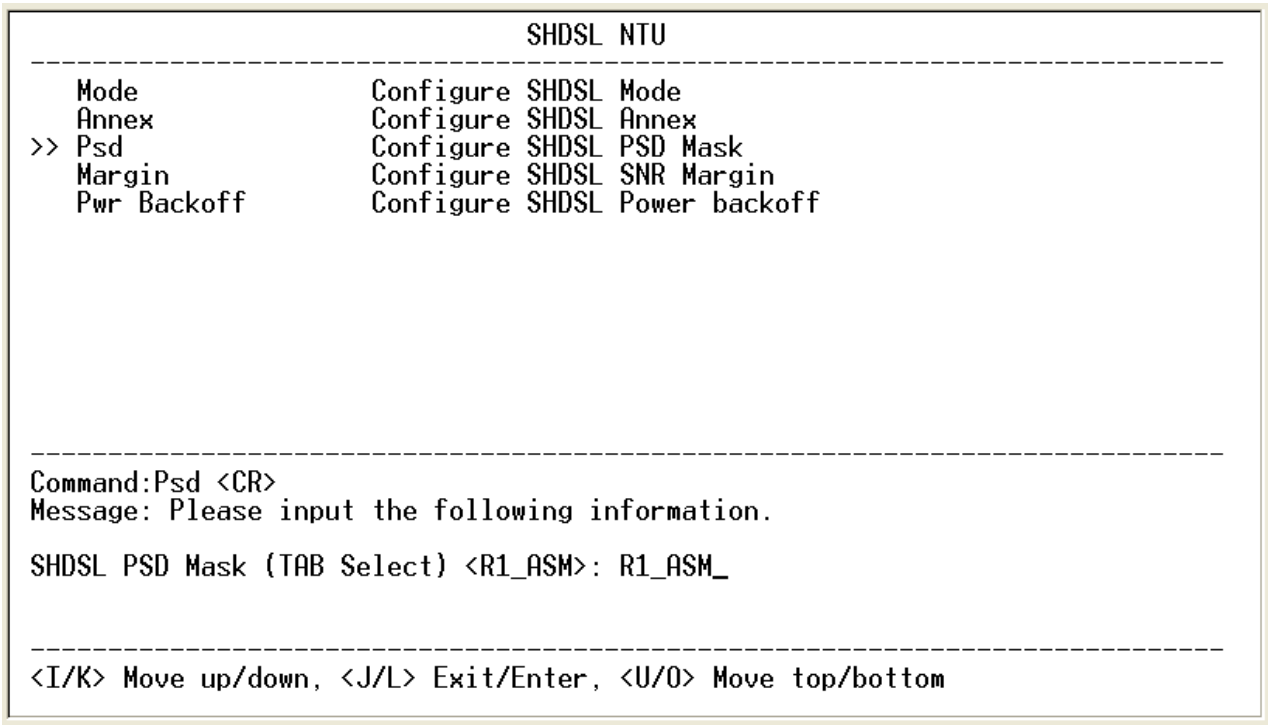
There are three SHDSL modes: **STU-R**, **STU-C-INTCLK** and **STU-C-EXTCLK**.
INTCLK: The device will generate the appropriate clock speed defined by the speed setting of the interface.
EXTCLK: The device will accept the clock from the interface and will use that clock to receive and transmit data across the interface.
Most applications use Internal Clock. If the DTE provides a clock with TX data, the clock can set to be External Clock.

To configure the SHDSL Annex type, move the cursor to **Annex** and press [ENTER or [L]]. Select the Annex type by using the [TAB] key.
Setup SHDSL parameter, Annex


SHDSL NTU
Mode Configure SHDSL Mode
>> Annex Configure SHDSL Annex
Psd Configure SHDSL PSD Mask
Margin Configure SHDSL SNR Margin
Pwr Backoff Configure SHDSL Power backoff
Command:Annex <CR>
Message: Please input the following information.
SHDSL Annex (TAB Select) <Annex-B>: Annex-B
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

There are two annex types: **Annex-A** and **Annex-B**

To configure SHDSL PSD, move the cursor to **psd** and press [ENTER] or [L]. Select the parameter by using the [TAB] key.
Setup SHDSL parameter, PSD


SHDSL NTU
Mode Configure SHDSL Mode
Annex Configure SHDSL Annex
>> Psd Configure SHDSL PSD Mask
Margin Configure SHDSL SNR Margin
Pwr Backoff Configure SHDSL Power backoff
Command:Psd <CR>
Message: Please input the following information.
SHDSL PSD Mask (TAB Select) <R1_ASM>: R1_ASM_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

There are four PSD types: **R1_ASM**, **R2_ASM**, **SYM_ENABLE** and **ASYM_DISABLE**.

To set SHDSL Margin, move the cursor to **margin** and press [ENTER] or [L]. You can key the SHDSL margin setting value.
Setup SHDSL parameter, SNR Margin

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Mode                 Configure SHDSL Mode
   Annex                Configure SHDSL Annex
   Psd                  Configure SHDSL PSD Mask
>> Margin               Configure SHDSL SNR Margin
   Pwr Backoff          Configure SHDSL Power backoff









--------------------------------------------------------------------------------
Command:Margin <CR>
Message: Please input the following information.

SHDSL Startup Margin (TAB Select) <0~10> (0) : 0~10
SHDSL Current Margin <0> (0~10): _

--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

SNR margin is an index of line connection. You can see the actual SNR margin from 0 to 10 in STATUS SHDSL. The larger SNR margin indicates a better line connection. For example, if you set SNR margin in the field to 3, the SHDSL connection will drop and reconnect when the SNR margin is lower than 3.

To configure SHDSL Power Back off function, move the cursor to **Pwr Backoff** and press [ENTER] or [L]. Select the parameter by using the [TAB] key.
Setup SHDSL parameter, Power Backoff

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Mode                 Configure SHDSL Mode
   Annex                Configure SHDSL Annex
   Psd                  Configure SHDSL PSD Mask
   Margin               Configure SHDSL SNR Margin
>> Pwr Backoff          Configure SHDSL Power backoff









--------------------------------------------------------------------------------
Command:Pwr Backoff <CR>
Message: Please input the following information.

SHDSL Power BackOff (TAB Select) <Disable>: Disable_


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

There are two power back-off types: **Disable** and **Enable**.

4.5.3 Configure E1 parameters

When using the E1 interface model, select the E1 item and press [ENTER] or [RIGHT].

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
>> E1                 Configure E1 Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









------------------------------------------------------------------------------
Command:E1 <more...> _
Message:




------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

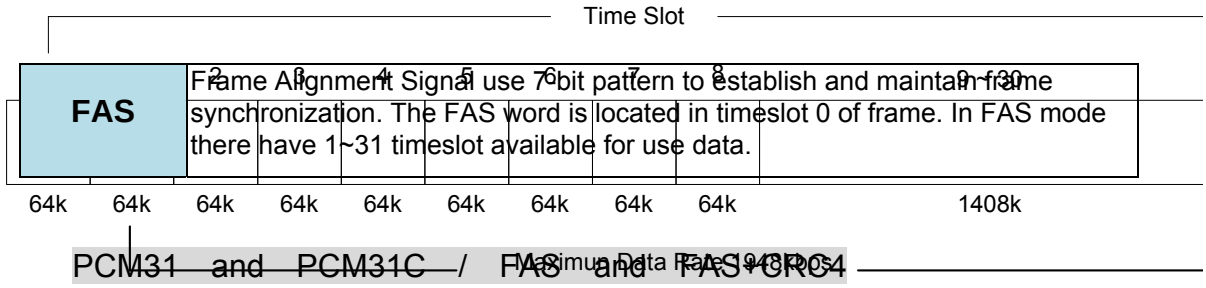
The E1 settings include: **Channel**, **line code**, **AIS** and **build out** settings.

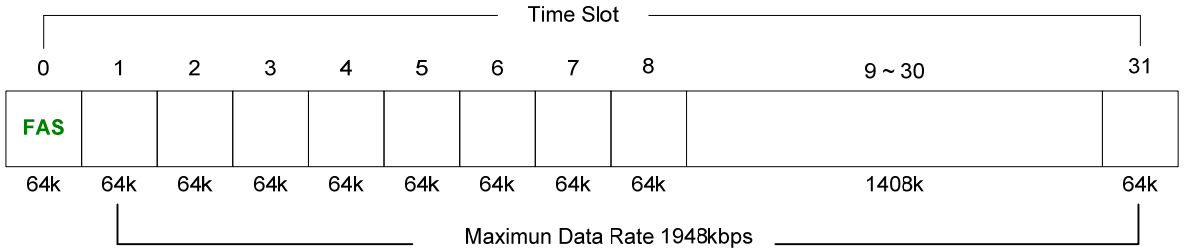
Setup E1 Parameter, Channel

```
                                SHDSL NTU
------------------------------------------------------------------------------
>> Channel            Configure E1 Channel
   Code               Configure E1 code
   Ais                Configure E1 AIS
   Build_outs         Configure E1 build outs









------------------------------------------------------------------------------
Command:Channel <CR>
Message:




------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Framing is required to recover the channelized E1. In transparent operation, the framing is configured as Unframed. In this case the G.SHDSL framer must be set to Nx64 with N=32. For any framing such as FAS or CAS, the G.SHDSL framer must be set to E1, then the E1 framing here may be set accordingly. The default setting is PCM31C.

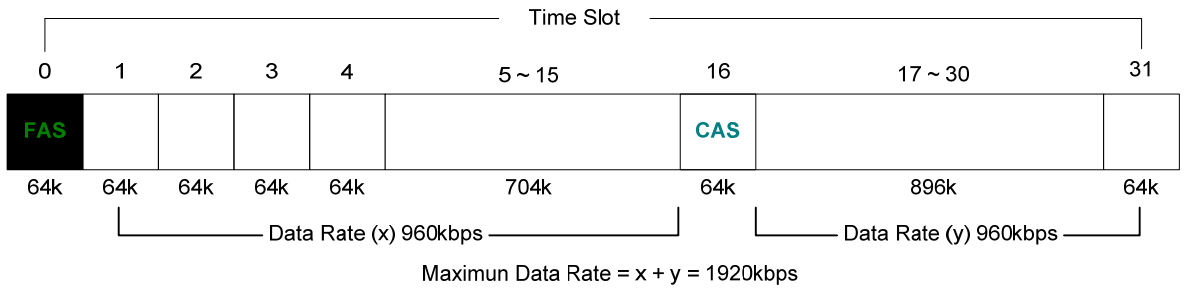
Channel	Framing
PCM31	FAS
PCM31C	FAS+CRC4
PCM30	FAS+CAS
PCM30C	FAS+CAS+CRC4
FULL	Unframed E1 (transparent)


Time Slot
FAS
Frame Alignment Signal use 7 bit pattern to establish and maintain frame synchronization. The FAS word is located in timeslot 0 of frame. In FAS mode there have 1~31 timeslot available for use data.
64k
1408k
PCM31 and PCM31C / FAS and FAS+CRC4
Maximun Data Rate 1948kbps



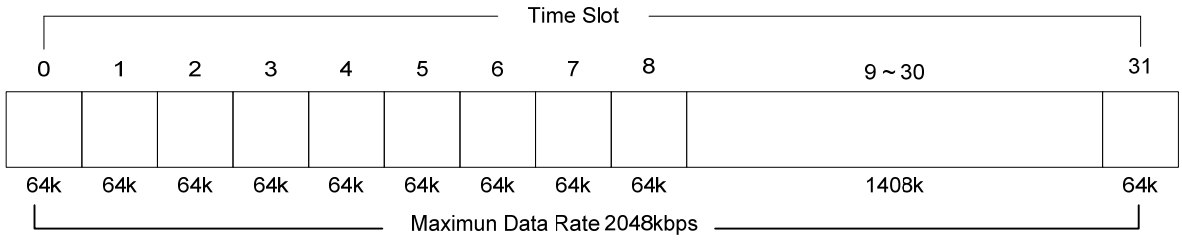
CAS	Also known as time slot 16 multiframing. It requires a multiframe alignment signal to be present for frame sync. The Multiframe Alignment Signal (MFAS) is inserted into the 16th timeslot of frame 0 of the 16-frame multiframe. In CAS mode, there have 30 channels available for user data. If timeslot 16 is included in the unit's mapping, it will be disregarded.

PCM30 and PCM30C / FAS+CAS and FAS+CAS+CRC4

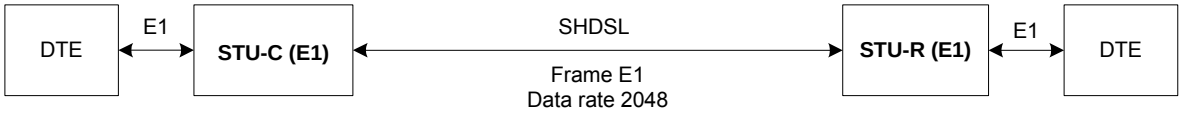


CRC4	The CRC-4 checksum bits are transmitted in the outgoing E1 data stream. Also the received signal is checked for errors. CRC-4 checksum cannot be sent in unframed mode.
Unframed	In this mode, user data is inserted into all 32 channels (64k x 32 = 2048k) of the E1 stream. The object of running without framing is to utilize the full bandwidth of the E1 line.

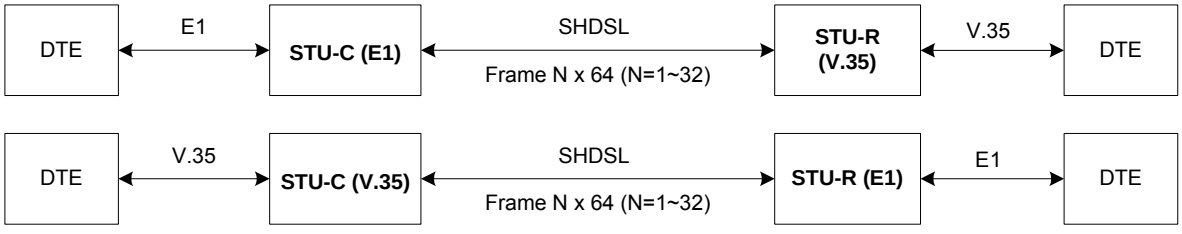
UNFRAMED



G.703 (E1) can supports data rate of 2048kbps, so the maximum data rate of SHDSL line, connected with E1 DCEs, depends on data rate of E1, 2048kbps.



If the connection is E1 vs V.35 or V.35 vs E1, the framing must use N x 64k. In this case, the data rate depends on value of N. SHDSL and V35 can support 2304kbps data rate (36 x 64k) but E1 supports maximum data rate of 2048kbps (32 x 64k).

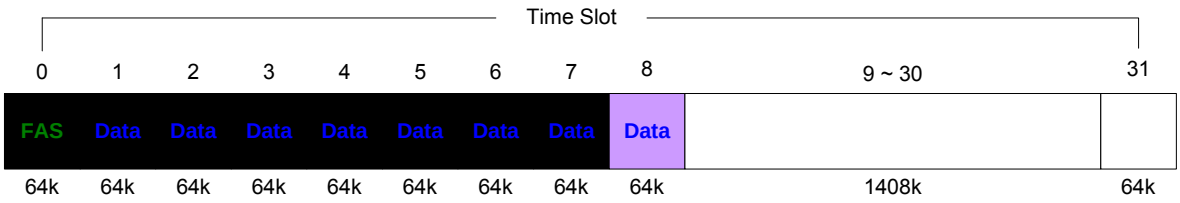


Time slot, N value, is place of data in the frame. Time Slot Number 1~31 (N=1~31) is Fractional E1 and Time Slot Number 32 (N=32) is unframed.

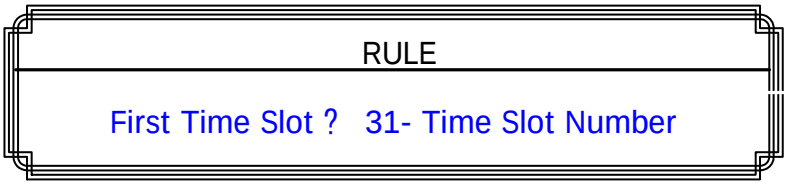
Fractional E1

For fractional E1(FE1), the data rate is from 64k, N=1, to 1984k, N=31, according to the E1 frame.
If the E1 frame is PCM31(FAS) or PCM31C(FAS+CRC4), there are 1~31 available time slots for data use.

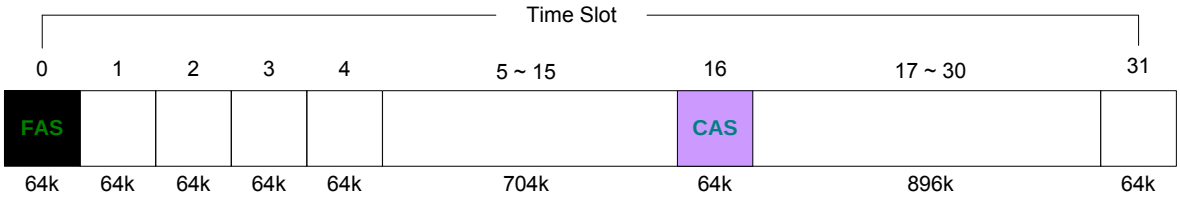
For example, if the data rate of SHDSL line is set to 512k, the time slot number is 8 and first time slot number is 1. The frame is shown as below.



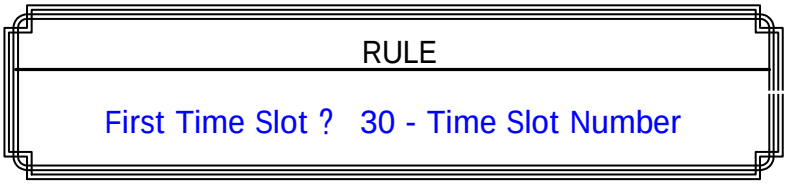
The First Time Slot setting of FAS and FAS+ CRC4 (PCM31 and PCM31C) must follow this rule:



Using E1 framing FAS+CAS or FAS+CAS+CRC4(PCM30 or PCM30C), the [FAS] will occupy Time Slot 0 and [CAS] will occupy Time Slot 16. There are only 30 Time Slots left for data. The data rate is 1920kbps (30x64Kbps).

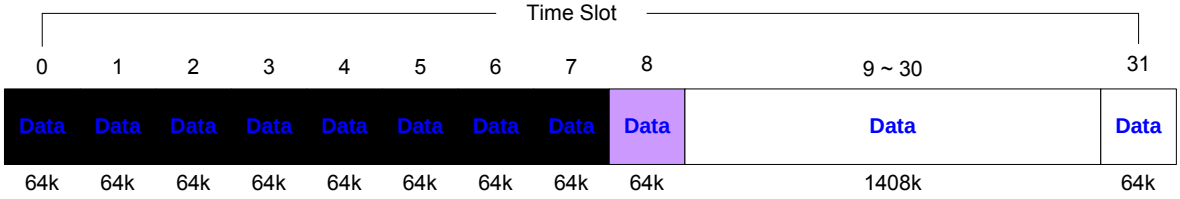


The First Time Slot setting of FAS+CAS and FAS+CAS+CRC4 (PCM30 and PCM30C) must to follow this rule:

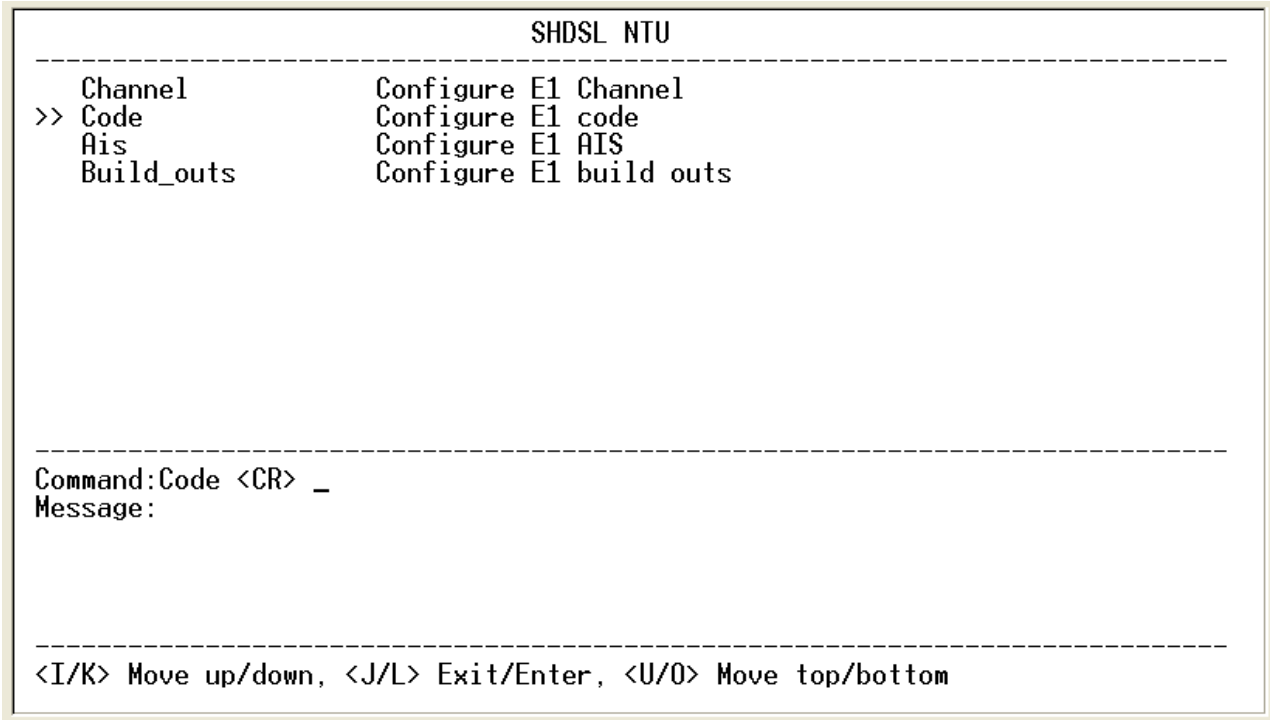


Unframed E1

Used data is inserted into all 32 channels (64Kbps x 32 = 2048Kpbs) of the E1 bit stream


Time Slot
0 1 2 3 4 5 6 7 8 9 ~ 30 31
Data Data Data Data Data Data Data Data Data Data Data
64k 64k 64k 64k 64k 64k 64k 64k 64k 1408k 64k

Setup E1 Parameter, Line Code



The G.SHDSL NTU supports two different line codes: **HDB3** or **AMI**.
HDB3 is the most popular and preferred line coding and is also the default setting.
AMI line coding is also selectable.

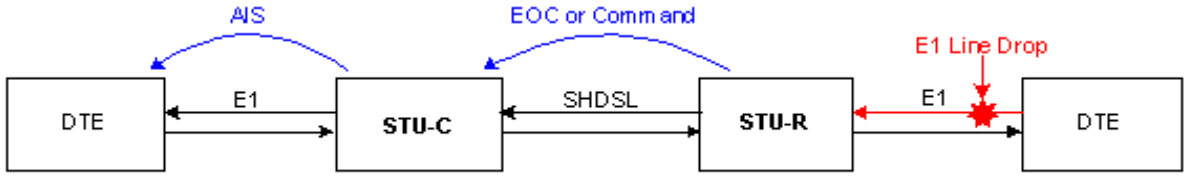
HDB3	In this line coding, the transmitter substitutes a deliberate bipolar violation when excessive zeros in the data stream are detected. The receiver recognizes these special violations and decodes them as zeros. This method enables the network to minimum pulse density requirements. Unless AMI is required for your application, HDB3 should be used whenever possible.
AMI	Alternate Mark Inversion defines a pulse as a “mark,” a binary one as, as opposed to a zero. In an E1 network connection, signals are transmitted as a sequence of one and zero. One is sent as pulse, and zero is sent as space, i.e. no pulse. Every other pulse is inverted from the previous pulse in polarity, so that the signal can be effectively transmitted. This means, however, that a long sequence of zero in data stream will cause problems, since the NTU receiving the signal relies on the signal to recover the 2048kbps clock.

Setup E1 Parameter, AIS

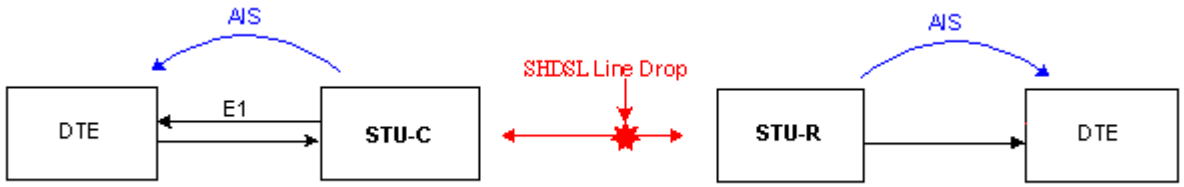
```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Channel              Configure E1 Channel
   Code                 Configure E1 code
>> Ais                  Configure E1 AIS
   Build_outs           Configure E1 build outs









--------------------------------------------------------------------------------
Command:Ais <CR>
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

AIS (Alarm Indication Signal) is a method to inform the remote connection that there is a signal or sync problem with the E1. AIS is only valid in framed mode E1, not in Unframed E1. The setting here of AIS enabled (on) or not (off) and is for testing with AIS. When enabled, the E1 will transmit the forced AIS and it should be confirmed at the remote device (AIS indication lit). **After testing, please turn AIS back off**.

For example 1: When STU-R E1 RX line is drop, STU-R sends the status to STU-C via EOC or command, and then STU-C will send AIS (Alarm Indication Signal) to DTE while AIS function is enabled.



For example 2: When SHDSL connection drops, STU-R and STU-C both send AIS (Alarm Indication Signal) to DTE in the same time while AIS function is enabled.



Setup E1 Parameter, Build Out

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Channel              Configure E1 Channel
   Code                 Configure E1 code
   Ais                  Configure E1 AIS
>> Build_outs           Configure E1 build outs









--------------------------------------------------------------------------------
Command:Build_outs <CR>
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The G.SHDSL NTU can support both unbalanced E1 at 75 ohms and balanced E1 at 120 ohms. The settings for impedance are made here under the build out menu setting.

4.5.4 Configure Data parameters

When using the Data interface model, select the Serial item and press [ENTER] or [RIGHT].

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Interface            Configure NTU Interface
   Shdsl                Configure SHSDL Parameters
>> Serial               Configure Serial Parameters
   Rmtcfg               Enable/Disable Remote Config
   Default              Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Serial <more...> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The Serial settings include: **Interface**, **data rate**, **clocking** and **handshaking** lines (RTS, CTS, DSR and DCD) setup etc.

```
                                SHDSL NTU
------------------------------------------------------------------------------
>> Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




------------------------------------------------------------------------------
Command:Interface <CR> _
Message:




------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Setup Data Parameter, Interface

```
                                SHDSL NTU
------------------------------------------------------------------------------
>> Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




------------------------------------------------------------------------------
Command:Interface <CR>
Message: Please input the following information.

Change V.35 Interface (TAB Select) <V35>: V35


------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can set Data interface to V.35 or RS-530(X.21,RS-449) hardware standard.

Setup Data Parameter, Data Rate

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Interface          Configure Serial Interface
>> Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




--------------------------------------------------------------------------------
Command:Data rate <CR>
Message: Please input the following information.

Change Serial Nx64 (TAB Select) <32>: 32_


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

For Data data rate, the default setting is N=32. The date rate can be adjusted in increments of 64kbps from 64kbps to 2304kbps (N=1~36).

Setup Data Parameter, Clock Polarity

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
>> Clock              Configure Serial clock
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




--------------------------------------------------------------------------------
Command:Clock <CR>
Message: Please input the following information.

Change Serial Clock (TAB Select) <normal>: normal_


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The data port clock polarity may be adjusted to solve some rare clocking issues that can result from varying cable lengths. The default setting is 'Normal' clock polarity, where data is sent on the positive transition of the clock, while the option exists to set inverse clock polarity where data is sent on the negative clock transition.

Setup Data Parameter, RTS

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
>> Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




------------------------------------------------------------------------------
Command:Rts <CR>
Message: Please input the following information.

Change Serial RTS (TAB Select) <on>: on_


------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The behavior of the RTS (Request To Send) signal may be set in one of two ways. When set 'on', the RTS signal is always forced high (on, positive voltage or SPACE), when set 'from DTE' the RTS signal will follow the DTE's condition. The default setting for RTS is ON.

Setup Data Parameter, CTS

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Rts                Configure Serial rts
>> Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




------------------------------------------------------------------------------
Command:Cts <CR>
Message: Please input the following information.

Change Serial CTS (TAB Select) <from_rts>: from_rts_


------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The behavior of the CTS (Clear To Send) signal may be set in one of three ways. When set 'on', the CTS signal is always forced high (on, positive voltage or SPACE), when set 'off' the signal is always forced low (off, negative voltage or MARK), or CTS will follow RTS (Request To Send) condition of 'on' for RTS on 'off' for RTS off. The default setting for CTS is to follow RTS.

Setup Data Parameter, DSR

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Rts                Configure Serial rts
   Cts                Configure Serial cts
>> Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




------------------------------------------------------------------------------
Command:Dsr <CR>
Message: Please input the following information.

Change Serial DSR (TAB Select) <on>: on


------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The behavior of the DSR (Data Set Ready) signal may be set in one of three ways. When set 'on', the DSR signal is always forced high (on, positive voltage or SPACE), when set 'off' the signal is always forced low (off, negative voltage or MARK), or DSR will follow DTR (Data Terminal Ready) condition of 'on' for DTR on or 'off' for DTR off. The default setting for DSR is ON.

Setup Data Parameter, DCD

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
>> Dcd                Configure Serial dcd
   Delay              Configure Serial delay




------------------------------------------------------------------------------
Command:Dcd <CR>
Message: Please input the following information.

Change Serial DCD (TAB Select) <from_dsl>: from_dsl


------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The behavior of the DCD (Data Carrier Detect) signal may be set in one of three ways. When set 'on', the DCD signal is always forced high (on, positive voltage or SPACE), when set 'off' the signal is always forced low (off, negative voltage or MARK), or DCD will follow the DSL condition of 'on' for DSL link or 'off' for DSL no link. The default setting for DCD is to follow the DSL link status.

Setup Data Parameter, Delay

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
>> Delay              Configure Serial delay




--------------------------------------------------------------------------------
Command:Delay <CR>
Message: Please input the following information.

Change Serial Delay <3> (0~3): 3


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

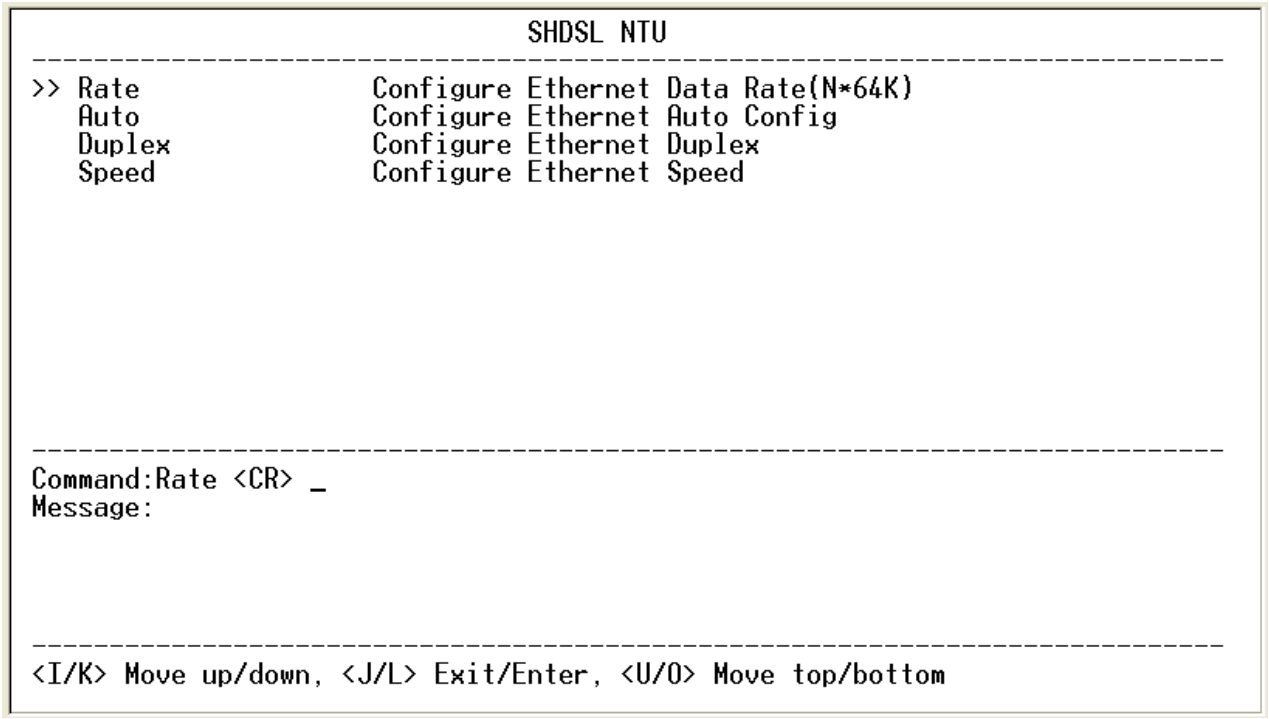
The delay setting is used to cause a delay for CTS to follow RTS. The delay setting may be set from 0 to 3 milliseconds. The default setting is 3 milliseconds.

4.5.5 Configure Ethernet parameters

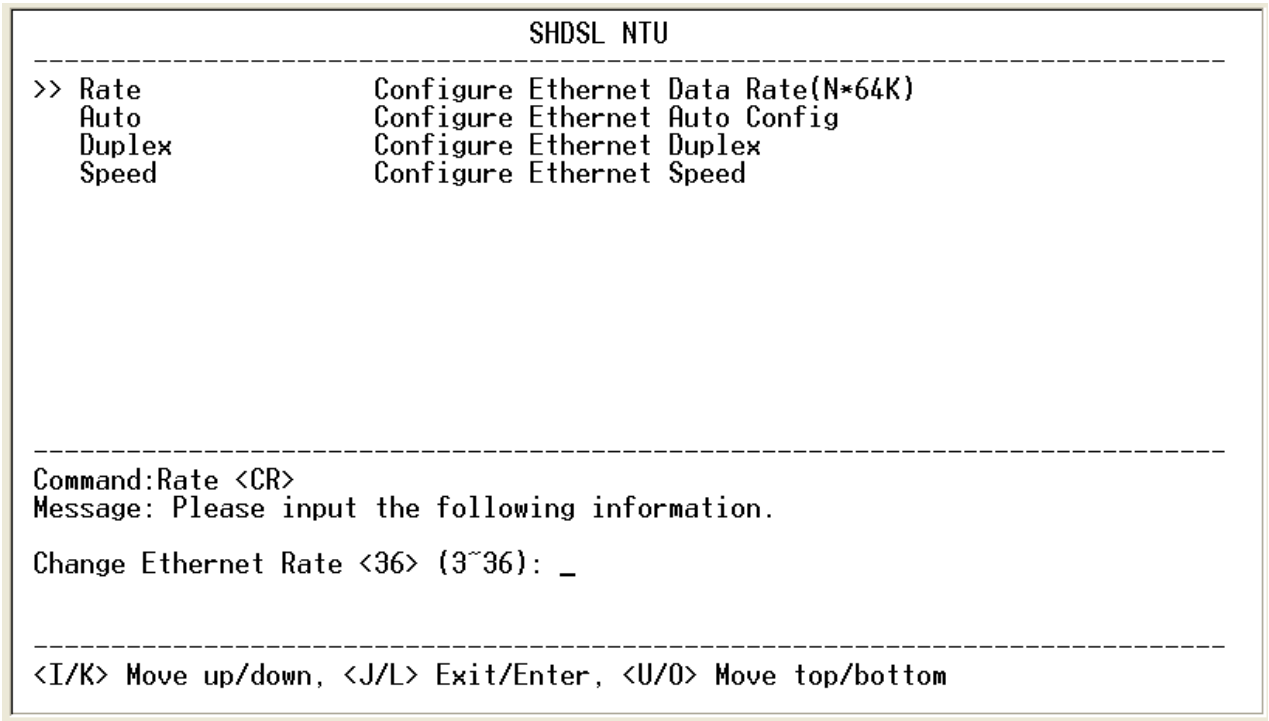
When using the Ethernet interface model, select the Ethernet item and press [ENTER] or [RIGHT].

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
>> Ethernet           Configure Ethernet Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Ethernet <more...> _
Message:




--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The Ethernet settings include: **data rate**, **auto config**, **duplex** and **speed**.



Setup Interface Parameter, Data Rate


SHDSL NTU
>> Rate Configure Ethernet Data Rate(N*64K)
Auto Configure Ethernet Auto Config
Duplex Configure Ethernet Duplex
Speed Configure Ethernet Speed
Command:Rate <CR>
Message: Please input the following information.
Change Ethernet Rate <36> (3~36): _
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

For date rate, the default setting is 36, or full rate. The date rate can be adjusted in increments of 64kbps from 64kbps to 2304kbps (N=1~36).

Setup Ethernet Parameter, Auto Configuration

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Rate                 Configure Ethernet Data Rate(N*64K)
>> Auto                 Configure Ethernet Auto Config
   Duplex               Configure Ethernet Duplex
   Speed                Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Auto <CR>
Message: Please input the following information.

Change Ethernet Auto Config  (TAB Select) <Enable>: Enable_


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can select Enable and Disable for auto configuration.

When auto configuration enabled, the other parameters Duplex and Speed cannot be set.

On this case, the message will show as ”Ethernet is in auto negotiate”

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Rate                 Configure Ethernet Data Rate(N*64K)
   Auto                 Configure Ethernet Auto Config
>> Duplex               Configure Ethernet Duplex
   Speed                Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Duplex <CR>  Ethernet is in auto negotiate
Message:




--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Rate                 Configure Ethernet Data Rate(N*64K)
   Auto                 Configure Ethernet Auto Config
   Duplex               Configure Ethernet Duplex
>> Speed                Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Speed <CR>  Ethernet is in auto negotiate
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

If auto configuration is disabled, the other parameter Duplex and Speed can setup in forced mode.

Setup Ethernet Parameter, Duplex

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Rate                 Configure Ethernet Data Rate(N*64K)
   Auto                 Configure Ethernet Auto Config
>> Duplex               Configure Ethernet Duplex
   Speed                Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Duplex <CR>
Message: Please input the following information.

Change Ethernet Duplex  (TAB Select) <Full-Duplex>: Full-Duplex_


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can set up the duplex mode as Full-Duplex or Half-Duplex.

Setup Ethernet Parameter, Speed

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Rate                 Configure Ethernet Data Rate(N*64K)
   Auto                 Configure Ethernet Auto Config
   Duplex               Configure Ethernet Duplex
>> Speed                Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Speed <CR>
Message: Please input the following information.

Change Ethernet Speed (TAB Select) <100M>: 100M


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can set up the Ethernet speed as 10Mbps or 100Mbps.

Duplex Mismatch issues
When using forced mode Ethernet, be sure that both devices on the Ethernet cable are set to the same forced mode speed and duplex. Do not connect a forced mode Ethernet device to an auto negotiation device unless you set the forced mode device to half duplex. This is because when an auto negotiation device fails negotiation, it assumes a half duplex mode. This is the standard behavior defined in IEEE 802.3u.

4.5.6 Enable and Disable Remote configuration

You can set the “Enable/Disable Remote Config Capability” so that the remote side can receive configuration parameters remotely.

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Interface            Configure NTU Interface
   Shdsl                Configure SHSDL Parameters
   Ethernet             Configure Ethernet Parameters
>> Rmtcfg               Enable/Disable Remote Config
   Default              Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Rmtcfg <CR>
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

4.5.7 Restore factory default setting

The G.SHDSL NTU can have all settings restored to their original factory settings simply by going to the setting menu, selecting the Default item, and then press ENTER. The system will ask for a y(es) or n(o) confirmation followed by an ENTER.

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
   Ethernet           Configure Ethernet Parameters
   Rmtcfg             Enable/Disable Remote Config
>> Default            Restore NTU's Default Setting









------------------------------------------------------------------------------
Command:Default <CR>
Message: Please input the following information.

Are you sure? (y/n):


------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

When the message DONE is displayed, it means that the restore was succesful.

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
   Ethernet           Configure Ethernet Parameters
   Rmtcfg             Enable/Disable Remote Config
>> Default            Restore NTU's Default Setting









------------------------------------------------------------------------------
Command:Default <CR>
Message: Done_

Are you sure? (y/n): y


------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The default vaules are as the following:

SHDSL	setup NTU Interface setup NTU Type setup Shdsl Annex setup Shdsl Psd setup Shdsl Margin setup Shdsl Power BackOff	E1 STU-R Annex-B ASYM_DISABLE 0 Disable
E1	setup E1 Channel setup E1 Slot Number setup E1 First Slot setup E1 code setup E1 AIS setup E1 Build Outs	PCM31C 31 1 HDB3 Off 120 Ohm
Data	setup Data Interface setup Data Data Rate setup Data Clock setup Data Rts setup Data Cts setup Data Dsr setup Data Dcd setup Data Delay	V35 32 normal on from_rts on from_dsl 3
Ethernet	Setup Ethernet Rate setup Ethernet Auto Config setup Ethernet Speed setup Ethernet Duplex	36 Enable Auto negotiate Auto negotiate

4.6 [Status] View the system status

You can use the status command to view the status of SHDSL, E1, Data and Interface as well as statistic and clear the statistic log. Select **status** and press [ENTER].
If the two SHDSL NTU modems are connected, you can also view the remote side's statistic data.

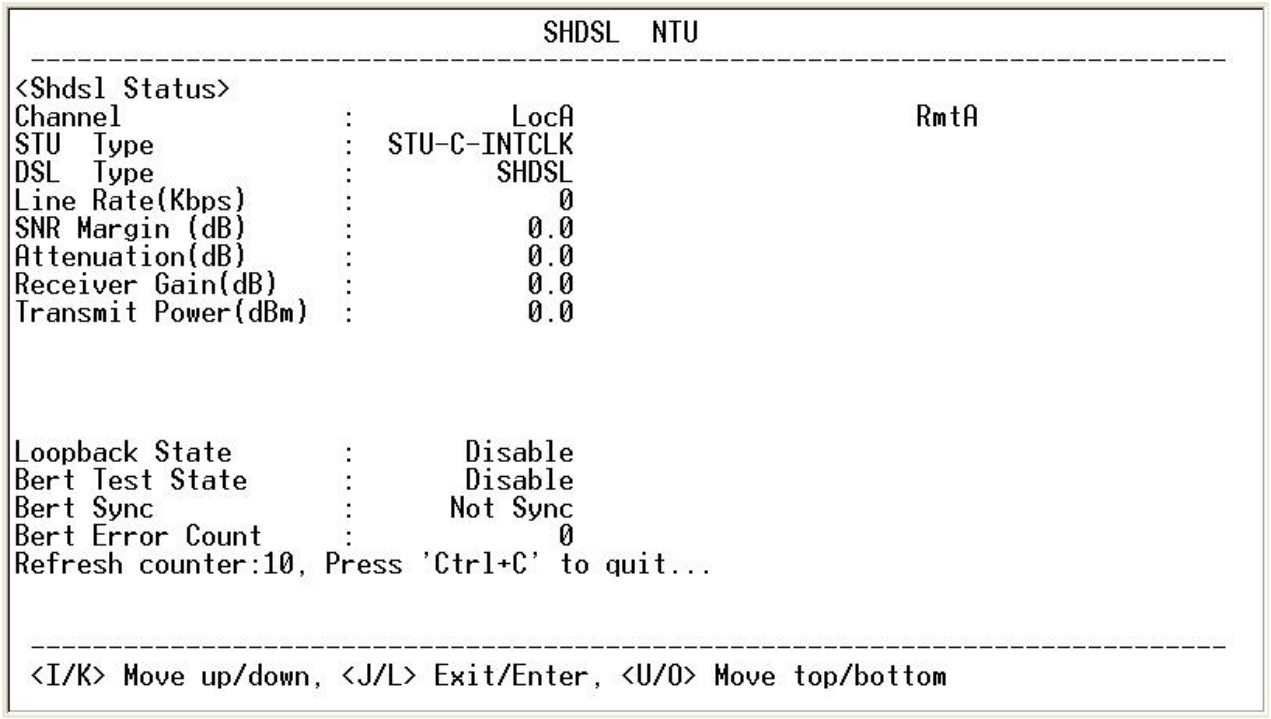
```
                                SHDSL NTU
--------------------------------------------------------------------------------
   setup                Configure system
>> status               Show running system status
   show                 View system configuration
   reboot               Reset and boot system
   diag                 Diagnostic utility
   upgrade              Console software upgrade
   exit                 Quit system




--------------------------------------------------------------------------------
Command:status <more...> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

4.6.1 Show SHDSL Status

Select **SHDSL** command to show the status of SHDSL.

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Shdsl                Show SHDSL Status
   Interface            Show Interface Status
   Current Perf         Show Current Performamce
   Loc_statistics       Show Local Statistics
   Rmt_statistics       Show Remote Statistics
   clear                Clear Channel Statistics









--------------------------------------------------------------------------------
Command:Shdsl <CR> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You will see the following screen:


SHDSL NTU
<Shdsl Status>
Channel : LocA RmtA
STU Type : STU-C-INTCLK
DSL Type : SHDSL
Line Rate(Kbps) : 0
SNR Margin (dB) : 0.0
Attenuation(dB) : 0.0
Receiver Gain(dB) : 0.0
Transmit Power(dBm) : 0.0
Loopback State : Disable
Bert Test State : Disable
Bert Sync : Not Sync
Bert Error Count : 0
Refresh counter:10, Press 'Ctrl+C' to quit...
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

The SHDSL status will display a real-time status of the SHDSL on local side and remote side if the two NTUs have connected. The screen is refreshed about every 1.5 seconds. The monitoring window displays the SHDSL line parameters, such as Line Rate, SNR margin, attenuation and Receiver Gain, Transmit Power, Loopback and BERT status etc. The lower window displays the loopback and BER test status.

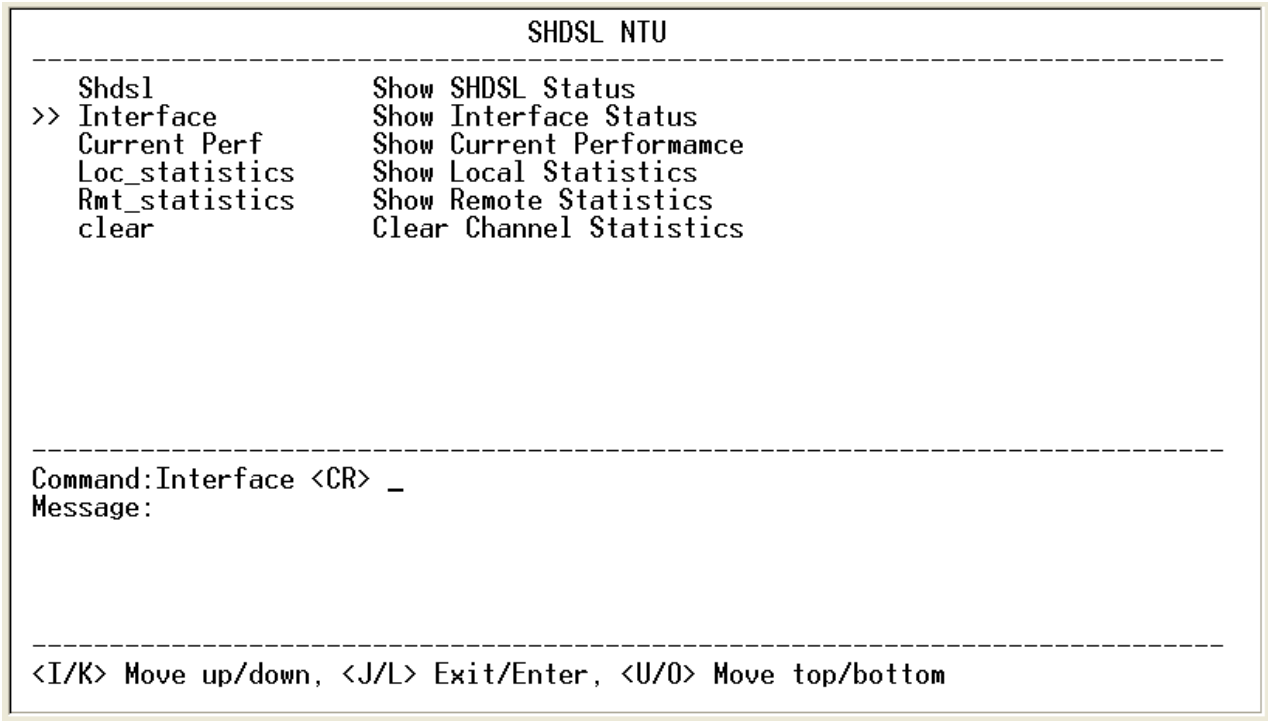
Table of SHDSL Line rate vs. Data rate:

SHDSL Line rate	Data Rate (kbps)	
	Number of time slot for E1	Nx64K for Data and Ethernet
2304(n=36)	Can't use	36
2240(n=35)	Can't use	35
2176(n=34)	Can't use	34
2112(n=33)	Can't use	33
2048(n=32)	32(unframed)	32
1984(n=31)	31	31
1920(n=30)	30	30
1856(n=29)	29	29
1792(n=28)	28	28
……	…….	…
384(n=6)	6	6
320(n=5)	5	5
256(n=4)	4	4
192(n=3)	3	3
192(n=3)*	2	2
192(n=3)*	1	1

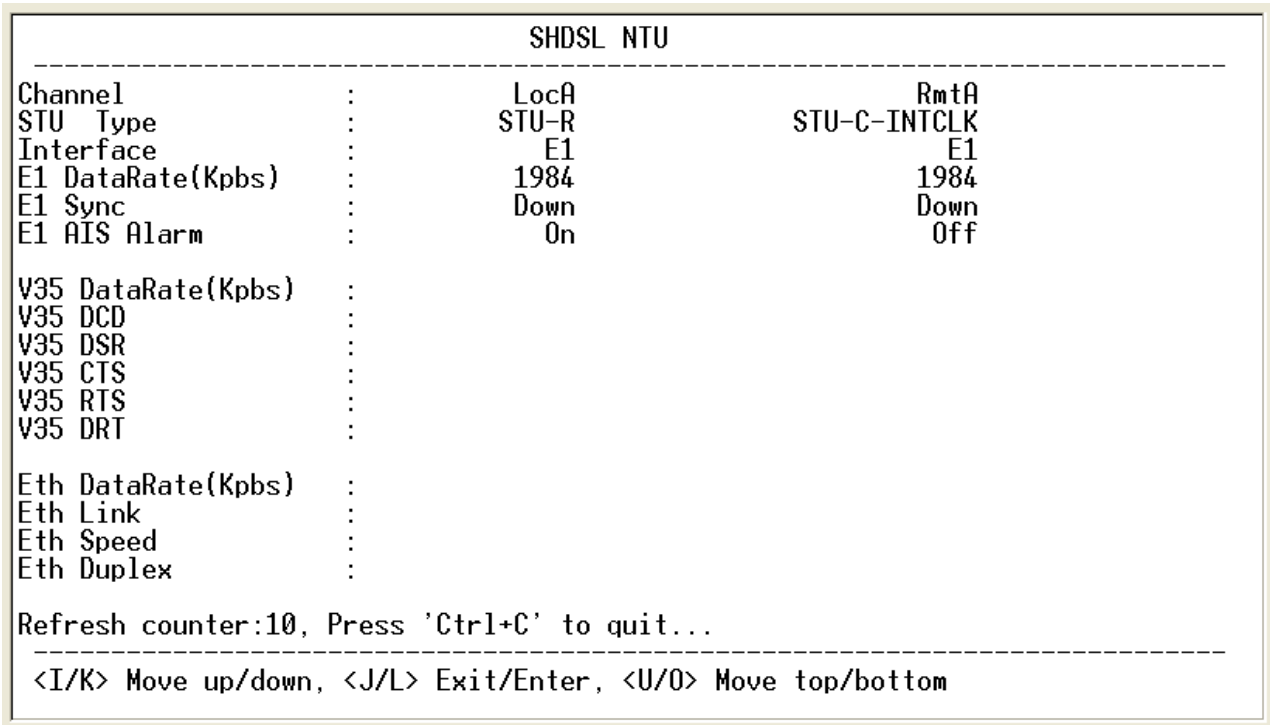
Note (*) : Because the SHDSL minimum line rate starts at 192kbps(n=3) , all settings on all interfaces with apply 64kbps(n=1) or 128kbps(n=2) are actually using 192kbps DSL line rate.

4.6.2 Show Interface Status

Select the Interface command to show the Interface status:



You can see all the interface status of E1, V.35 and Ethernet depending on the model used. While in this display mode the terminal window will not timeout. To exit the window, press CTRL-C.



4.6.3 Show Current Performance

Select Current Perf command to show the Current Performance.

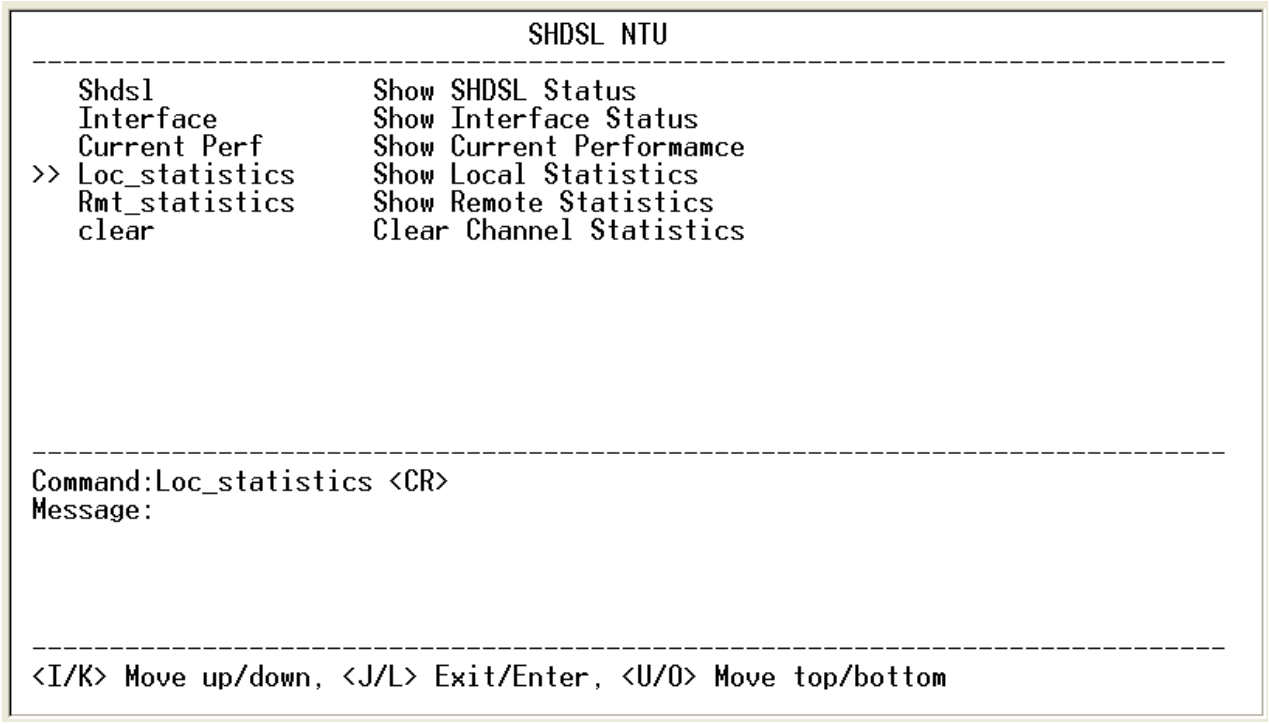
```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Shdsl               Show SHDSL Status
   Interface           Show Interface Status
>> Current Perf        Show Current Performamce
   Loc_statistics      Show Local Statistics
   Rmt_statistics      Show Remote Statistics
   clear               Clear Channel Statistics









--------------------------------------------------------------------------------
Command:Current Perf <CR> _
Message:




--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

This window displays the accumulated performance data for the current 15 minute interval and for the current 24 hour interval. While in this display mode the terminal window will not timeout. To exit the window, press CTRL-C.

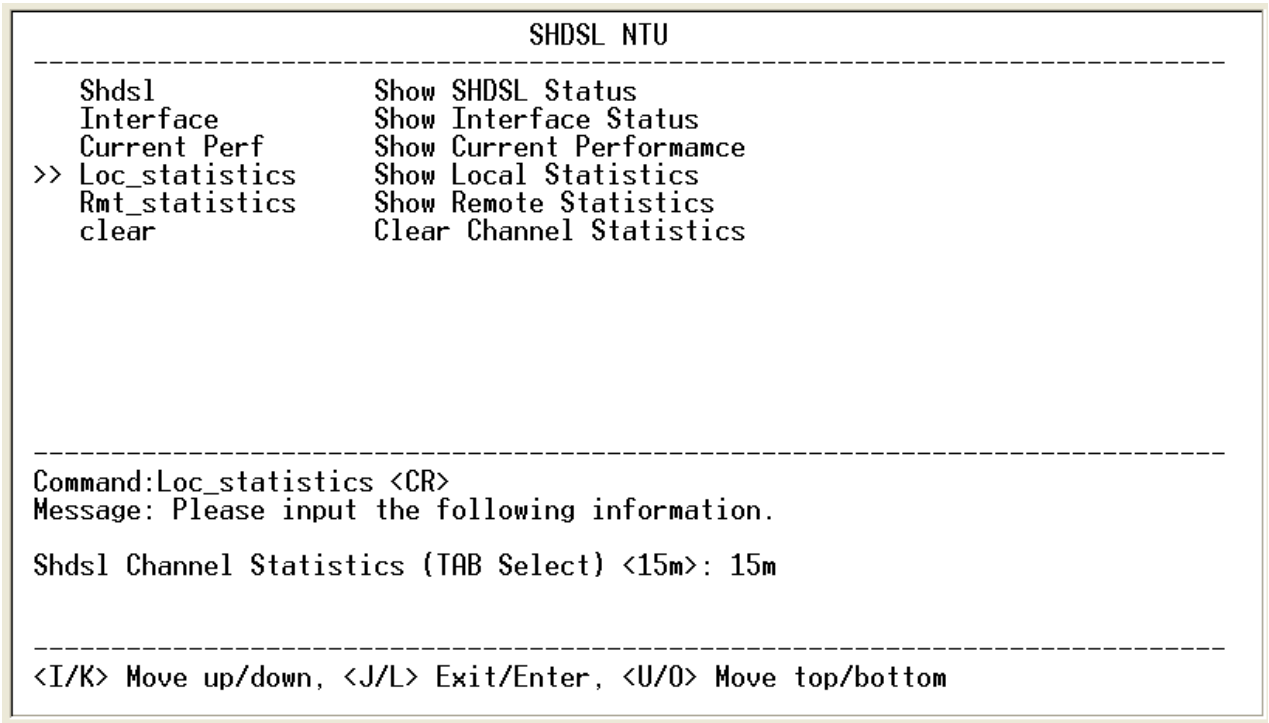
```
                                SHDSL NTU
 ------------------------------------------------------------------------------
Shdsl Performance
Channel                :          LocA                    RmtA
Interface              :            E1                E1 Serial
Current 15Min  ES      :             0                       0
               SES     :             0                       0
               UAS     :             0                       0
               LOSWS   :             0                       0
Current 24Hour ES      :             0                       0
               SES     :             0                       0
               UAS     :           114                    6041
               LOSWS   :             0                       0

E1 Performance
Current 15Min  ES      :             0                       0
               SES     :             0                       0
               UAS     :           647                     650
Current 24Hour ES      :             0                       0
               SES     :             0                       0
               UAS     :          1493                   14808
Refresh counter:1, Press 'Ctrl+C' to quit...
 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

4.6.4 View the Local and remote Statistics

Select **Loc_statistic** command to show the local side statistic information.



Either 15 minute or 24 hour statistics can be viewed by using the [TAB] key


SHDSL NTU
Shdsl Show SHDSL Status
Interface Show Interface Status
Current Perf Show Current Performamce
>> Loc_statistics Show Local Statistics
Rmt_statistics Show Remote Statistics
clear Clear Channel Statistics
Command:Loc_statistics <CR>
Message: Please input the following information.
Shdsl Channel Statistics (TAB Select) <15m>: 15m
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

The statistics display window will display performance monitor data for the selected interval (15 minutes or 24 hours).
The display will show the recorded results for ES (error seconds), SES(severely errored seconds), UAS (unavailable seconds), and LOSW (loss of sync word). While in this display mode the terminal window will not timeout. The 15 minute display window will display all the performance information for each 15 minute interval in the current 24 hour period. There are a total of 96 intervals.
Press the ENTER key to display the next page of intervals. To exit the window, press CTRL-C and then ENTER.

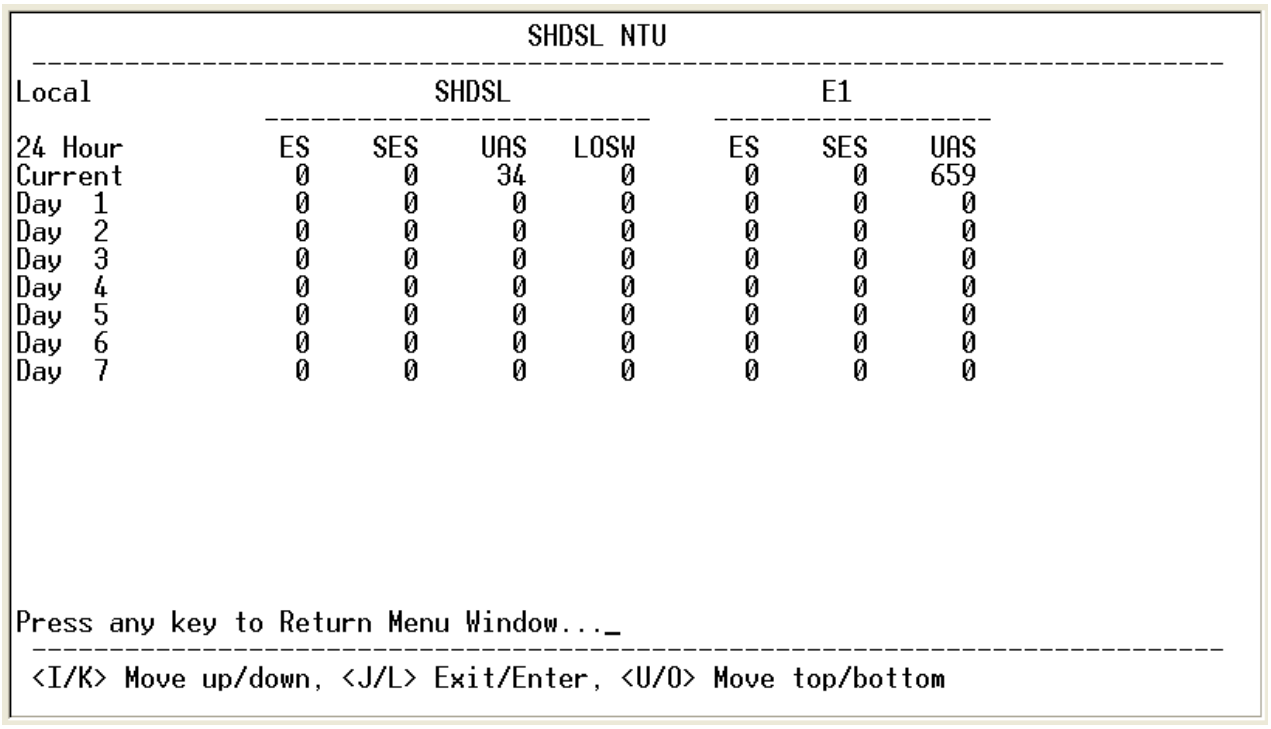
The performance monitor is capable of storing and retrieving performance information for each 24 hour interval, up to 7 days.

For **E1 Interface model** , there are both SHDSL and E1 performance items.

View the performance monitor data for the selected interval 15 minutes:

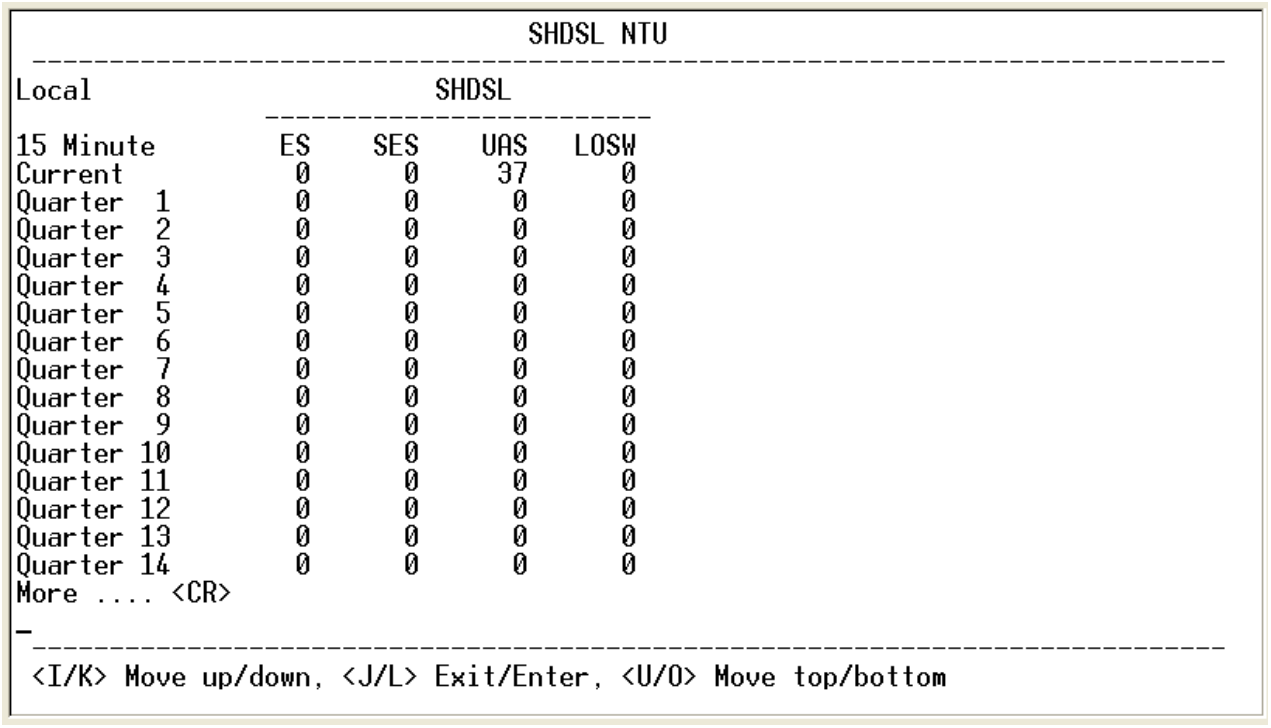
```
                                SHDSL NTU
 ------------------------------------------------------------------------------
Local                        SHDSL                      E1
                    -------------------------   ------------------
15 Minute           ES    SES    UAS   LOSW     ES    SES    UAS
Current              0      0      8      0      0      0    358
Quarter  1           0      0      0      0      0      0      0
Quarter  2           0      0      0      0      0      0      0
Quarter  3           0      0      0      0      0      0      0
Quarter  4           0      0      0      0      0      0      0
Quarter  5           0      0      0      0      0      0      0
Quarter  6           0      0      0      0      0      0      0
Quarter  7           0      0      0      0      0      0      0
Quarter  8           0      0      0      0      0      0      0
Quarter  9           0      0      0      0      0      0      0
Quarter 10           0      0      0      0      0      0      0
Quarter 11           0      0      0      0      0      0      0
Quarter 12           0      0      0      0      0      0      0
Quarter 13           0      0      0      0      0      0      0
Quarter 14           0      0      0      0      0      0      0
More .... <CR>

 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

View the performance monitor data for the selected interval 1 day:


SHDSL NTU
Local
SHDSL
E1
24 Hour ES SES UAS LOSW ES SES UAS
Current 0 0 34 0 0 0 659
Day 1 0 0 0 0 0 0 0
Day 2 0 0 0 0 0 0 0
Day 3 0 0 0 0 0 0 0
Day 4 0 0 0 0 0 0 0
Day 5 0 0 0 0 0 0 0
Day 6 0 0 0 0 0 0 0
Day 7 0 0 0 0 0 0 0
Press any key to Return Menu Window..._
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

For **Data** and **Ethernet Interface models**, there are performance data for SHDSL only.

View the performance monitor data for the selected interval 15 minutes:


SHDSL NTU
Local
SHDSL
15 Minute ES SES UAS LOSW
Current 0 0 37 0
Quarter 1 0 0 0 0
Quarter 2 0 0 0 0
Quarter 3 0 0 0 0
Quarter 4 0 0 0 0
Quarter 5 0 0 0 0
Quarter 6 0 0 0 0
Quarter 7 0 0 0 0
Quarter 8 0 0 0 0
Quarter 9 0 0 0 0
Quarter 10 0 0 0 0
Quarter 11 0 0 0 0
Quarter 12 0 0 0 0
Quarter 13 0 0 0 0
Quarter 14 0 0 0 0
More .... <CR>
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

View the performance monitor data for the selected interval 1 day:

```
                                    SHDSL NTU
 ------------------------------------------------------------------------------
Local                          SHDSL
                          -------------------------
24 Hour                ES     SES     UAS    LOSW
Current                 0       0      80       0
Day  1                  0       0       0       0
Day  2                  0       0       0       0
Day  3                  0       0       0       0
Day  4                  0       0       0       0
Day  5                  0       0       0       0
Day  6                  0       0       0       0
Day  7                  0       0       0       0









Press any key to Return Menu Window...
 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

If you want to view the remote side's statistics, please use the Rmt-statistics function as follows.

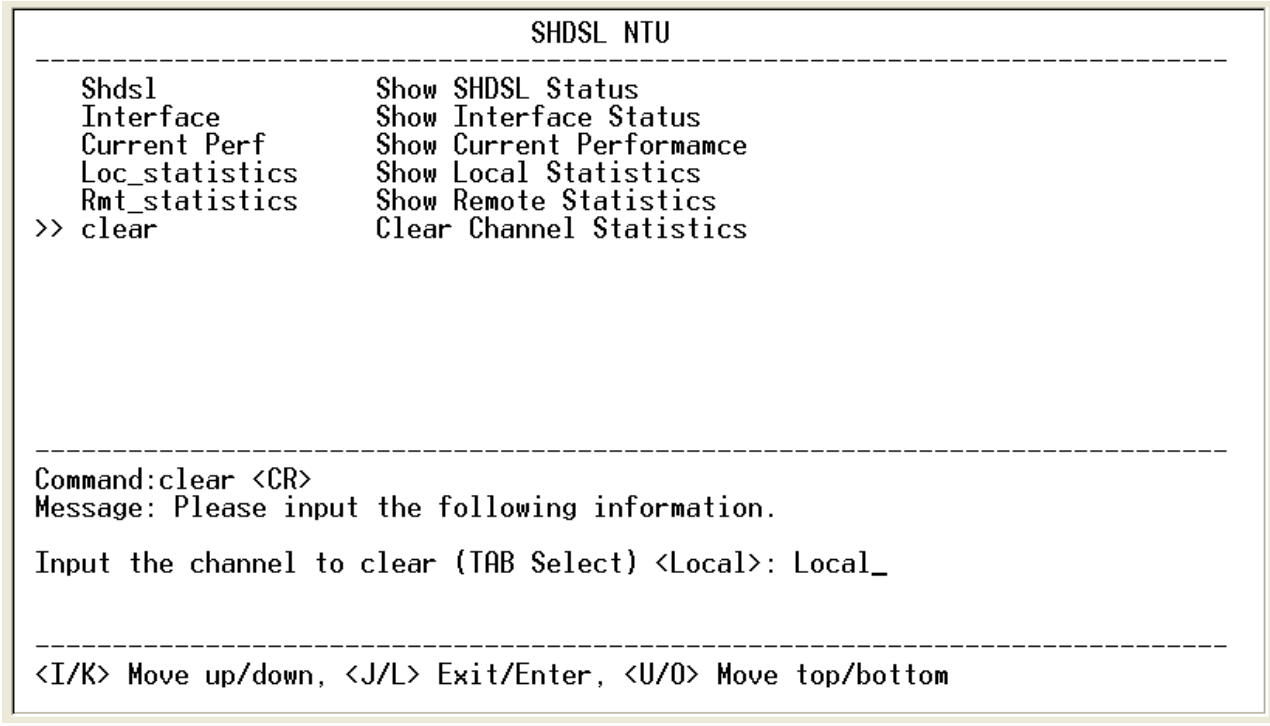
```
                                    SHDSL NTU
 ------------------------------------------------------------------------------
    Shdsl               Show SHDSL Status
    Interface           Show Interface Status
    Current Perf        Show Current Performamce
    Loc_statistics      Show Local Statistics
>>  Rmt_statistics      Show Remote Statistics
    clear               Clear Channel Statistics









 ------------------------------------------------------------------------------
 Command:Rmt_statistics <CR> _
 Message:




 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The following are commonly used acronyms:

ES	Number of error seconds in which one or more CRC (Cyclic Redundancy Check) error events occurred during the current interval. This value is updated every time.
UAS	Number of unavailable seconds in which a failed signal occurred during the current interval. This value is updated every time.
SES	Number of severely errored seconds in which 832 or more CRC error events occurred during the current interval. This value is updated every time.
LOSW	Number of seconds with loss of sync word during the current interval. This value is updated every time.

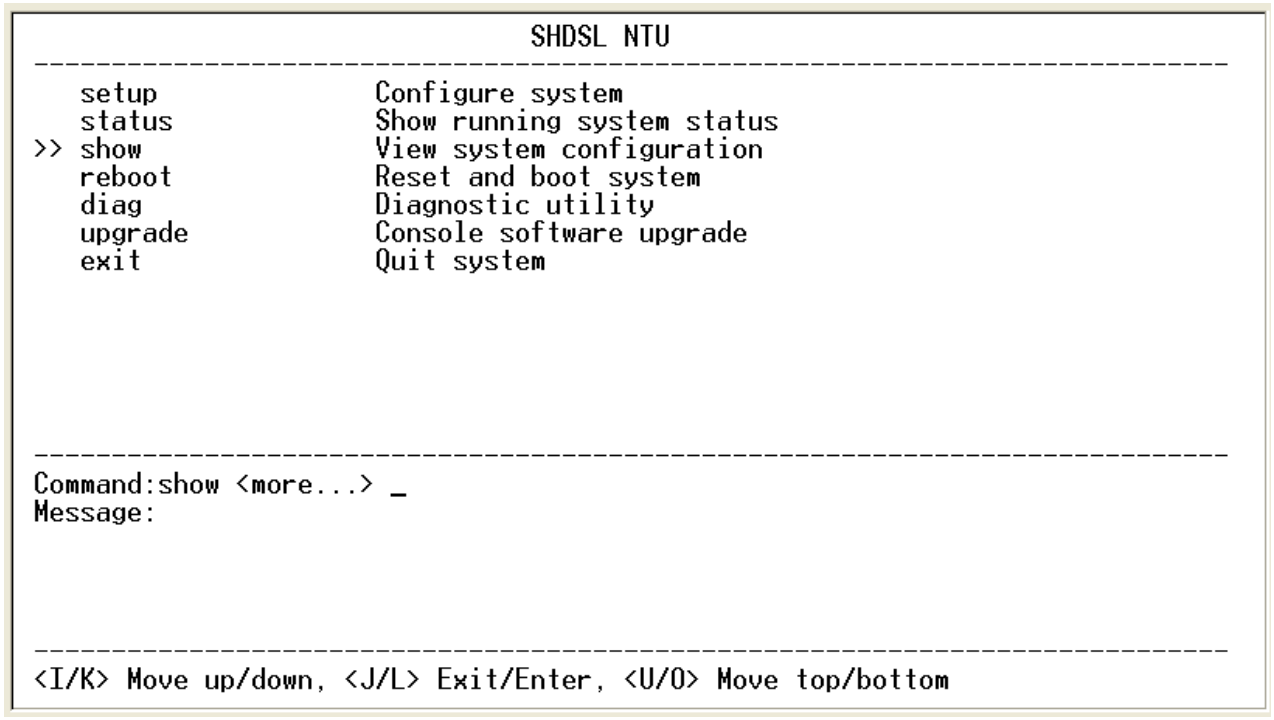
4.6.5 Clear Channel Statistics

If you want clear the statistics log data, please select clear command and choose **Local**, **Remote** or **Both side** to clear.


SHDSL NTU
Shdsl Show SHDSL Status
Interface Show Interface Status
Current Perf Show Current Performamce
Loc_statistics Show Local Statistics
Rmt_statistics Show Remote Statistics
>> clear Clear Channel Statistics
Command:clear <CR>
Message: Please input the following information.
Input the channel to clear (TAB Select) <Local>: Local_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

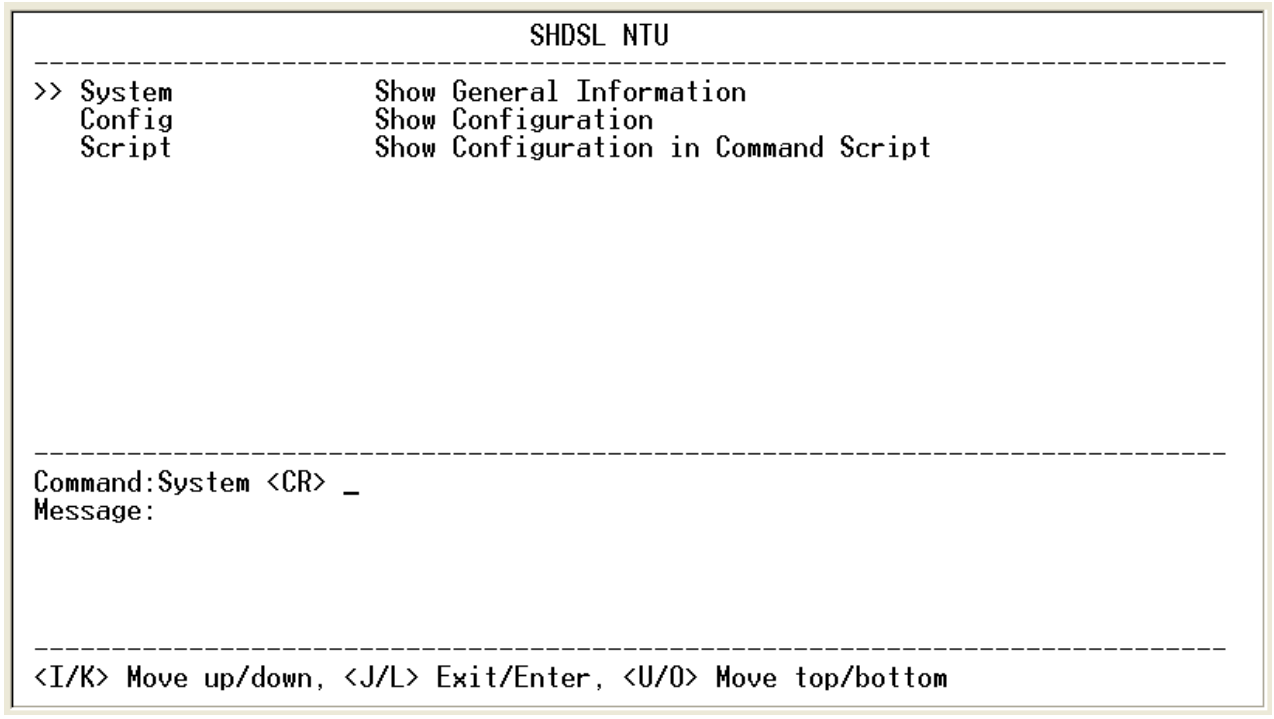
4.7 [Show] View System Configuration

By using show command, you can view the system configuring. Select **show** and press [ENTER] or [RIGHT].



4.7.1 Show general Interface

To show system information, please select **system** and press [ENTER] or [RIGHT]. The screen will prompt the system information.



The cursor is already on the **System** command, so press ENTER and the following screen will display the general system information.

```
                                SHDSL NTU
 ------------------------------------------------------------------------------
<System Info Window>
                      Local Side                  Remote Side
                    ==============            ==================
 Model          :          5030G V2                    5030G V2
 Sw Version     :              0.33                        0.33
 FPGA Version   :              0.10                        0.10
 CPU            :   Winbond W90N740             Winbond W90N740
 RAM            :              8MB                         8MB
 FLASH          :              2MB                         2MB
 Dsp Version    :            R3.1.1                      R3.1.1
 SerialNo       :      BKLM1234ABCD                BKLM1234ABCD
 System MCSV    : 1537-0000-10011244        1537-0000-10011244
 Kernel MCSV    : 1537-0012-03313AE1        1537-0012-03413AE3
 FPGA   MCSV    : 1388-0012-01013ADE        1388-0012-01013ADE
 System Live Time  : 0 Day/ 0Hour/ 48Min /44 Secs




 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Most of the information on this screen is either self explanatory or it is simply irrelevant for the end user. However, two items, the Kernel (SW Version) and FPGA (Field Programmable Gate Array) version will give the software and hardware versions respectively of NTU. These are important to know in case new firmware becomes available in the future to add extra functions of to fix unknown bugs from the original manufactured equipment.

4.7.2 Show configuration in listing format

To show the system configuration, please select **Config** and press [ENTER] or [RIGHT]. The screen will list the all configuration data.

For E1 interface model:

```
                                SHDSL NTU
 ------------------------------------------------------------------------------
Showing System Configuration...
setup NTU  Interface       :           E1
setup NTU  Type            :       STU-R
setup Shdsl Annex          :      Annex-B
setup Shdsl Psd            :         SYM
setup Shdsl Margin         :          21
setup Shdsl Power BackOff  :      Disable
setup E1 Channel           :         FULL
setup E1 Slot Number       :          32
setup E1 First Slot        :           1
setup E1 Code              :         HDB3
setup E1 AIS               :          Off
setup E1 Build Outs        :      120 Ohm
Press any key to Return Menu Window...
```

For Serial interface model:

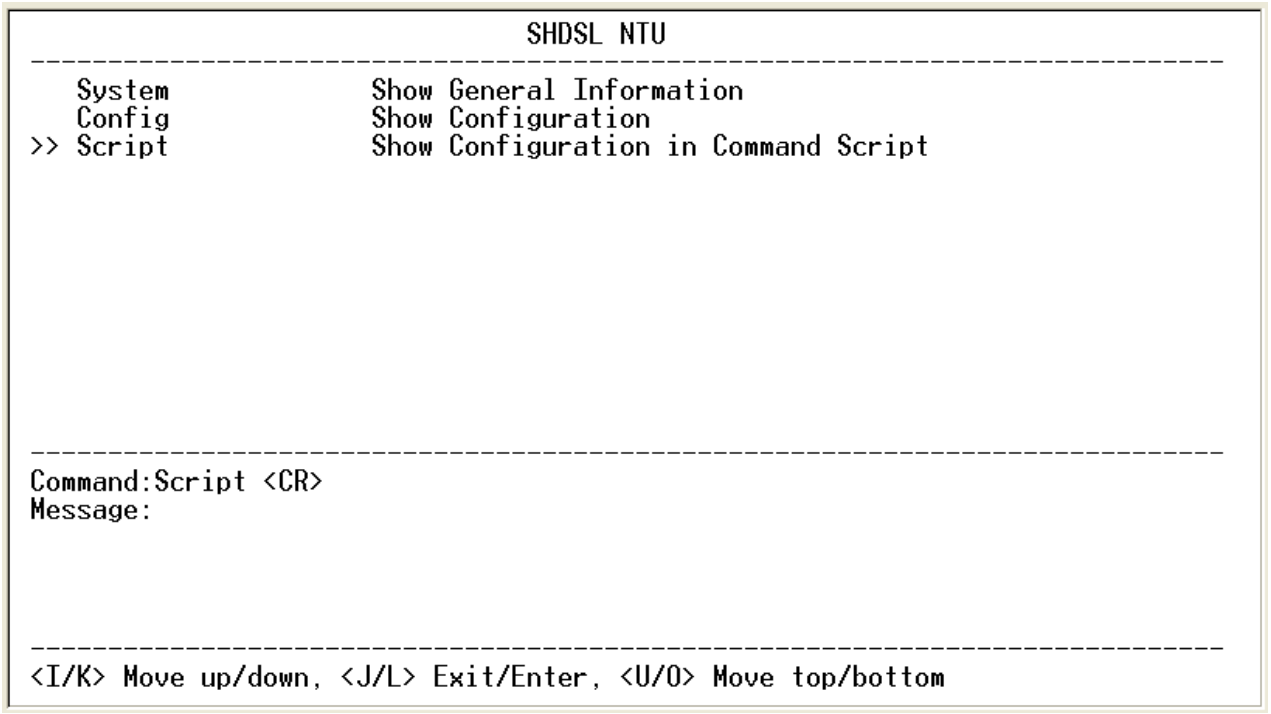
```
                                SHDSL NTU
 ------------------------------------------------------------------------------
Showing System Configuration...
setup NTU  Interface       :        Serial
setup NTU  Type            :         STU-R
setup Shdsl Annex          :       Annex-B
setup Shdsl Psd            :           SYM
setup Shdsl Margin         :            21
setup Shdsl Power BackOff  :       Disable
setup Serial Interface     :           V35
setup Serial Data Rate     :            32
setup Serial Clock         :        normal
setup Serial Rts           :            on
setup Serial Cts           :     from_rts
setup Serial Dsr           :            on
setup Serial Dcd           :     from_dsl
setup Serial Delay         :             3
Press any key to Return Menu Window..._
```

For Ethernet interface model:

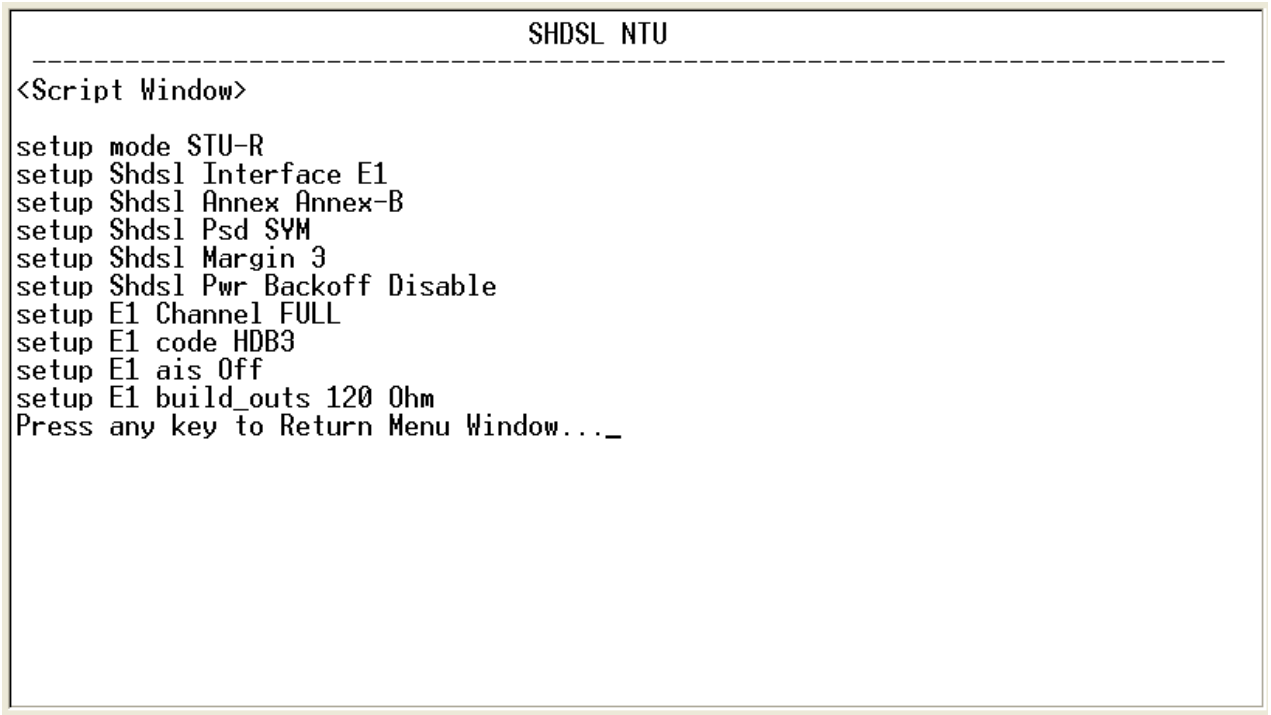
```
                                SHDSL NTU
 ------------------------------------------------------------------------------
Showing System Configuration...
setup NTU  Interface       :      Ethernet
setup NTU  Type            :         STU-R
setup Shdsl Annex          :       Annex-B
setup Shdsl Psd            :           SYM
setup Shdsl Margin         :            21
setup Shdsl Power BackOff  :       Disable
setup Ethernet Auto Config :        Enable
setup Ethernet Speed       :          100M
setup Ethernet Duplex      :   Full-Duplex
setup Ethernet Rate        :            36
Press any key to Return Menu Window..._
```

4.7.3 Show configuration in command script

To show the system script file, please select **Script** and press [ENTER] or [RIGHT]. The screen will list the configuration in script type.



For E1 interface model:


SHDSL NTU
<Script Window>
setup mode STU-R
setup Shdsl Interface E1
setup Shdsl Annex Annex-B
setup Shdsl Psd SYM
setup Shdsl Margin 3
setup Shdsl Pwr Backoff Disable
setup E1 Channel FULL
setup E1 code HDB3
setup E1 ais Off
setup E1 build_outs 120 Ohm
Press any key to Return Menu Window..._

For Serial interface model:

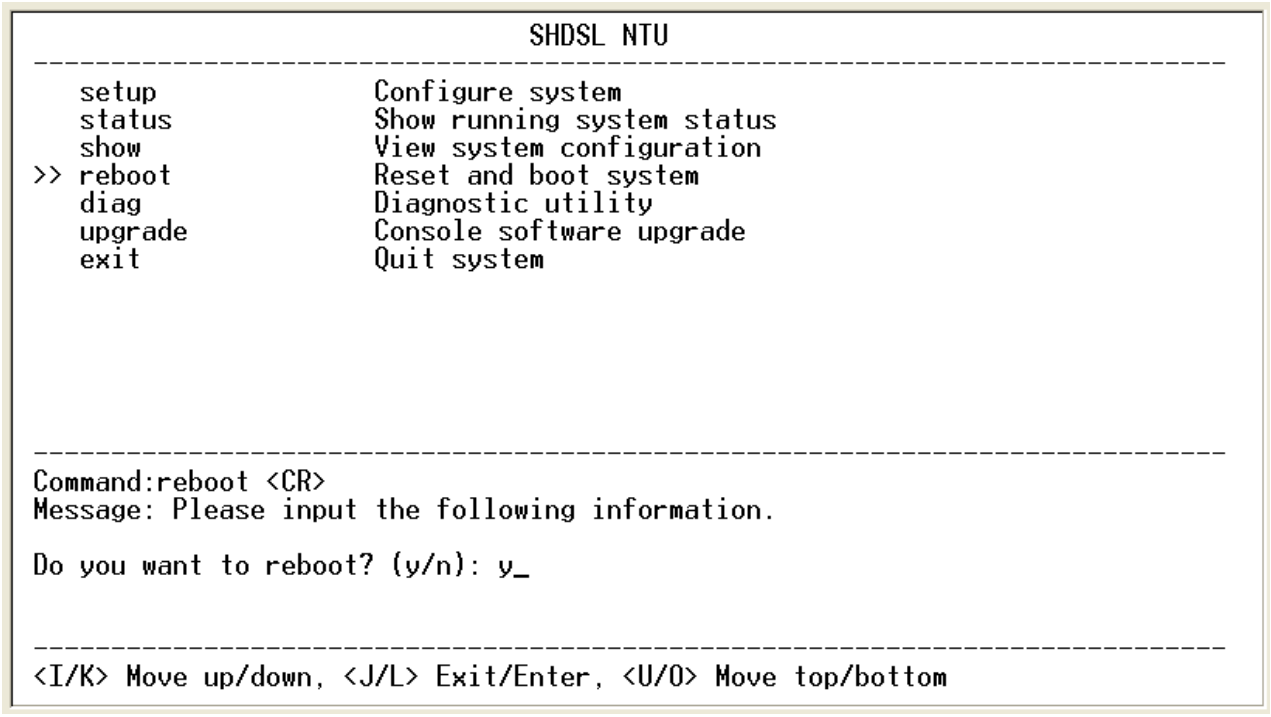
```
                                SHDSL NTU
 ------------------------------------------------------------------------------
<Script Window>

setup mode STU-R
setup Shdsl Interface Serial
setup Shdsl Annex Annex-B
setup Shdsl Psd SYM
setup Shdsl Margin 3
setup Shdsl Pwr Backoff Disable
setup Serial Interface V35
setup Serial Data Rate 32
setup Serial Clock normal
setup Serial Rts on
setup Serial Cts from_rts
setup Serial Dsr on
setup Serial Dcd from_dsl
setup Serial Delay 3
Press any key to Return Menu Window..._
```

For Ethernet interface model:

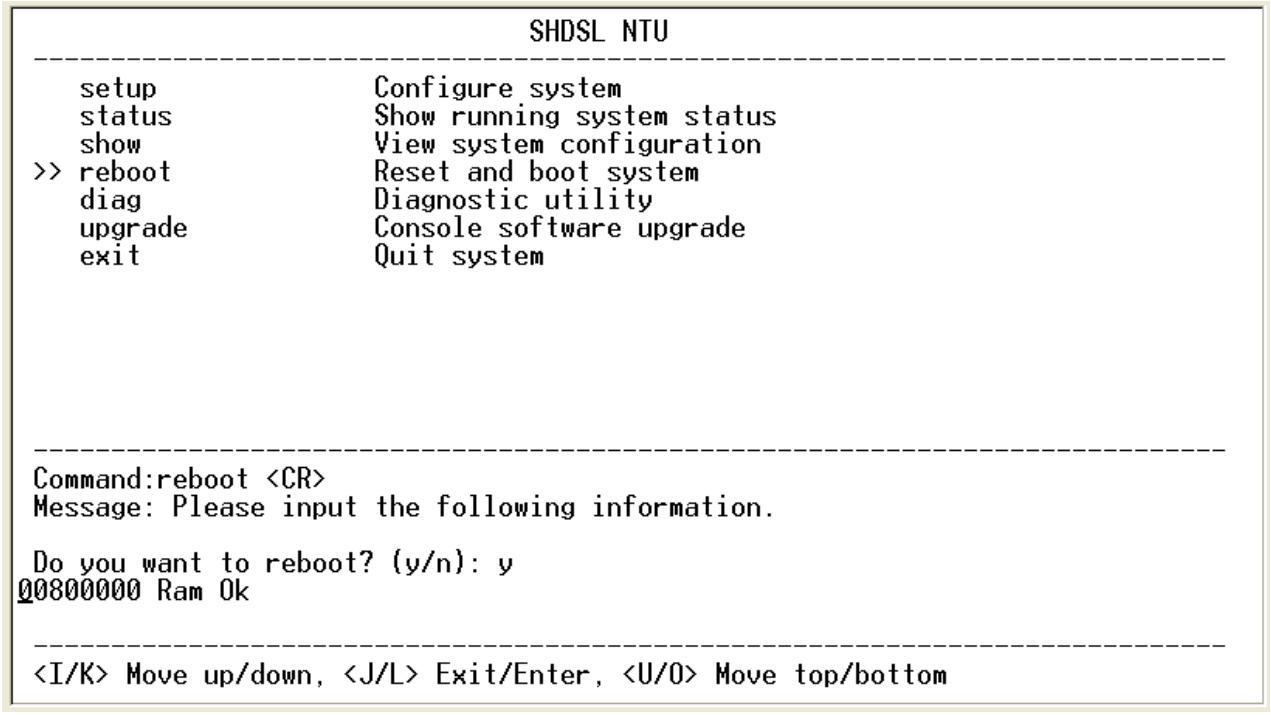
```
                                SHDSL NTU
 ------------------------------------------------------------------------------
<Script Window>

setup mode STU-R
setup Shdsl Interface Ethernet
setup Shdsl Annex Annex-B
setup Shdsl Psd SYM
setup Shdsl Margin 3
setup Shdsl Pwr Backoff Disable
setup Ethernet Rate 36
setup Ethernet Auto Enable
setup Ethernet Duplex Full-Duplex
setup Ethernet Speed 100M
Press any key to Return Menu Window...
```

4.8 [Reboot] Reboot the system

In main menu, move the cursor to **reboot** and press [ENTER]. The device will reboot after confirming.

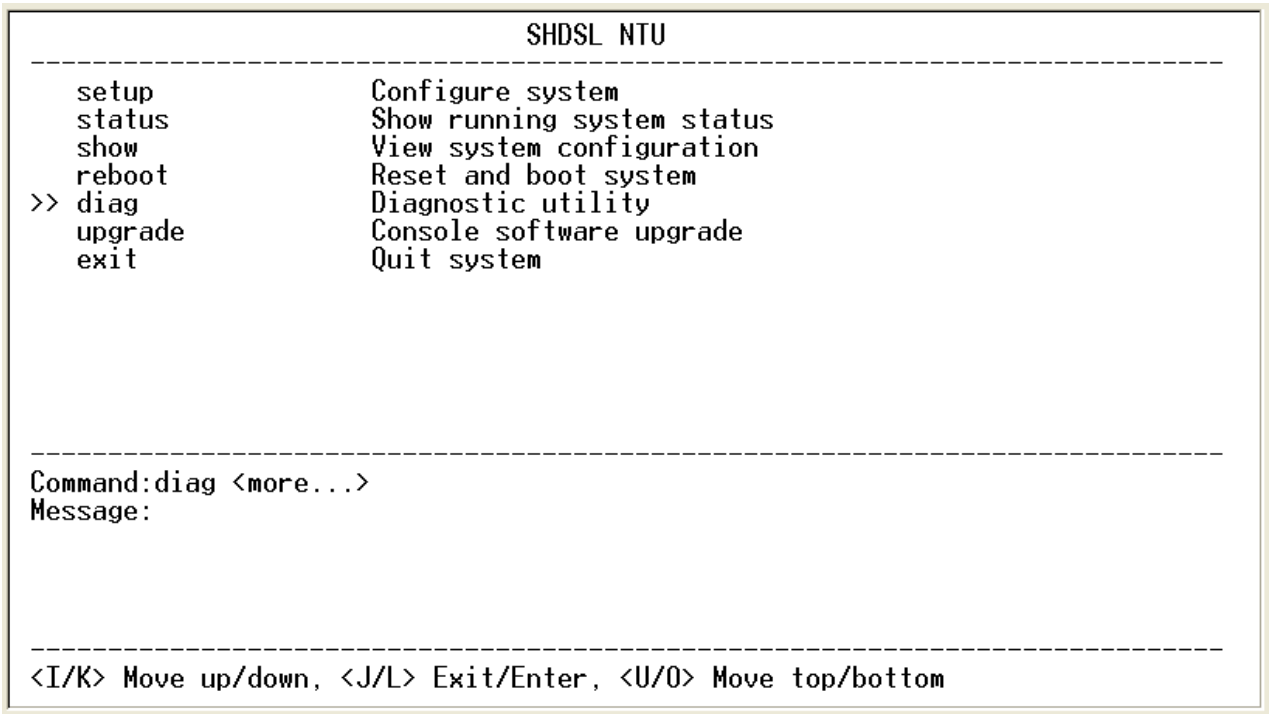

SHDSL NTU
setup Configure system
status Show running system status
show View system configuration
>> reboot Reset and boot system
diag Diagnostic utility
upgrade Console software upgrade
exit Quit system
Command:reboot <CR>
Message: Please input the following information.
Do you want to reboot? (y/n): y
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

After the reboot operation has finished, RAM test are start again.


SHDSL NTU
setup Configure system
status Show running system status
show View system configuration
>> reboot Reset and boot system
diag Diagnostic utility
upgrade Console software upgrade
exit Quit system
Command:reboot <CR>
Message: Please input the following information.
Do you want to reboot? (y/n): y
00800000 Ram Ok
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

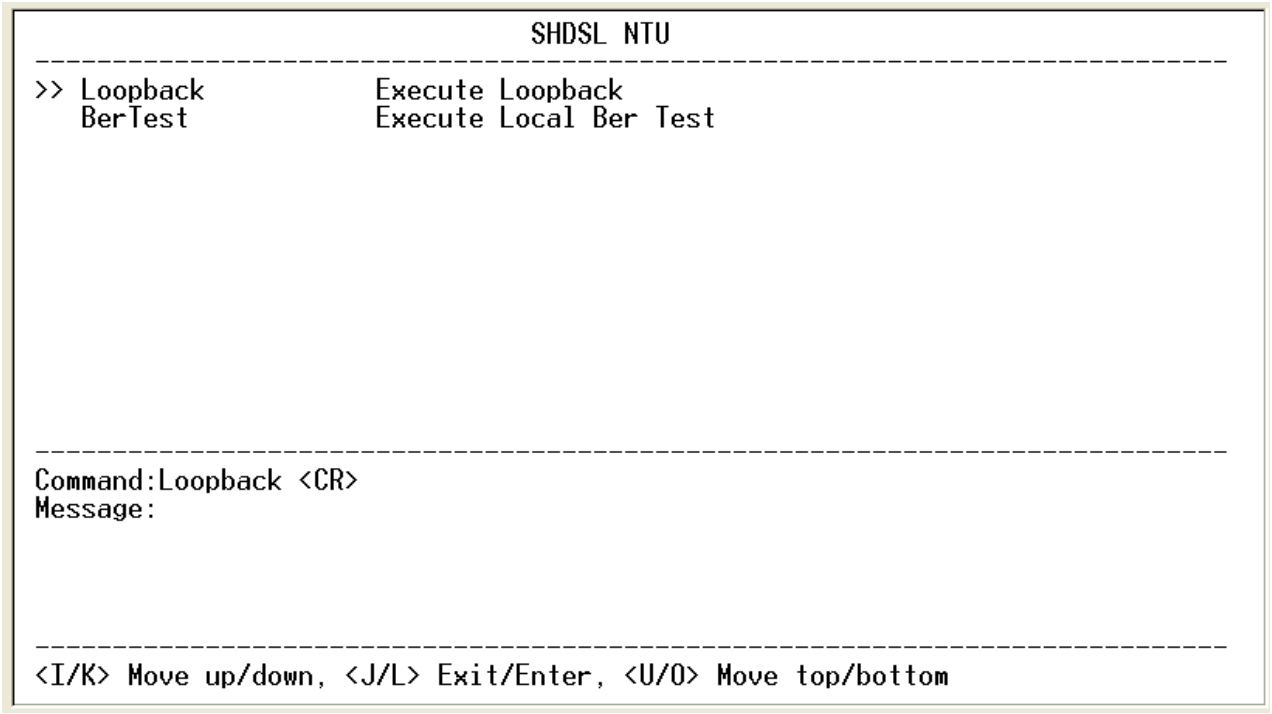
4.9 [Diag] Diagnostic – Loopback and BER Test

The diagnostic facility allows you to test the different aspects of your G.SHDSL NTU to determine if it is working properly. Select **diag** and press [ENTER] .



4.9.1 Loopback test

Loopback can test whether the NTU is properly working with the connected device.
Press [ENTER] or [RIGNT] to setup the loopback.



The loopback screen looks like the following:

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Loopback           Execute Loopback
   BerTest            Execute Local Ber Test









--------------------------------------------------------------------------------
Command:Loopback <CR>
Message: Please input the following information.

Change Loopback (TAB Select) <Disable>: Local Digital


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

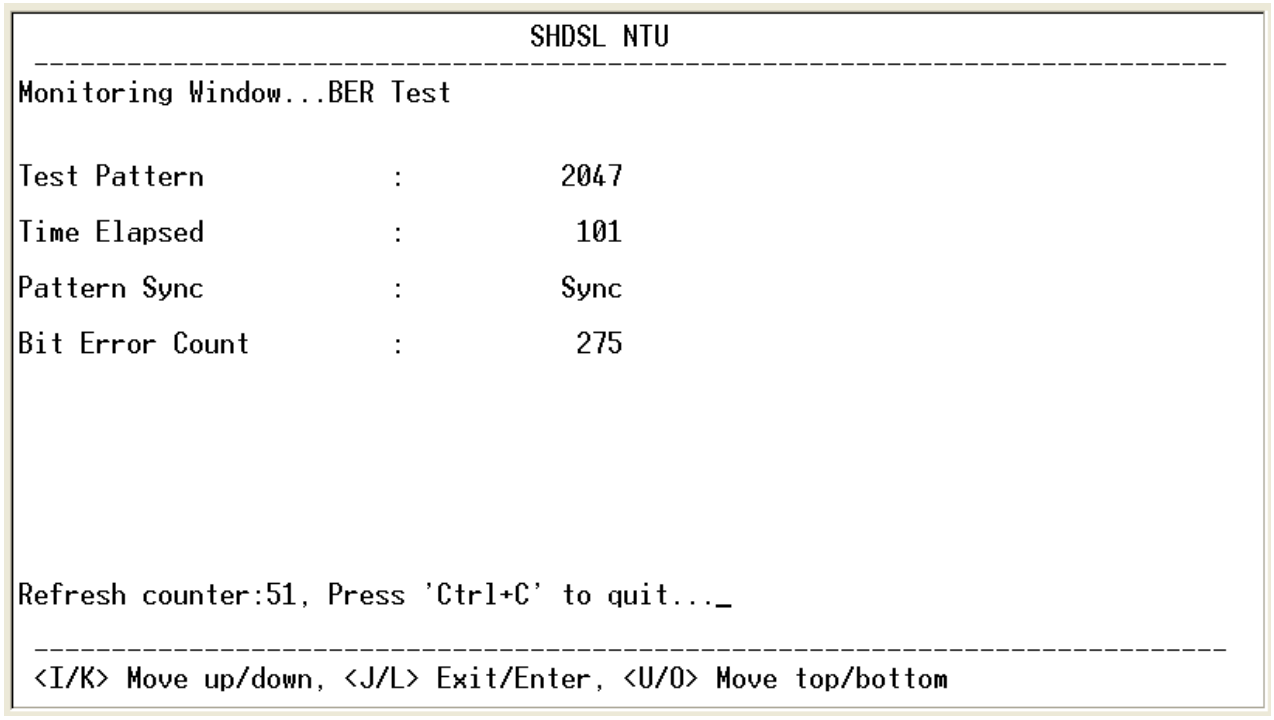
For more information about those loopback functions, please refer the Keypads and LCD setting chapter.

4.9.2 BER Test

The product supports Bit Error Rate Testing (BERT). To configure the BERT, move the cursor to BerTest and press [ENTER] or [RIGHT].

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Loopback           Execute Loopback
>> BerTest            Execute Local Ber Test









--------------------------------------------------------------------------------
Command:BerTest <CR> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The BER Test screen looks like the following:


SHDSL NTU
Monitoring Window...BER Test
Test Pattern : 2047
Time Elapsed : 101
Pattern Sync : Sync
Bit Error Count : 275
Refresh counter:51, Press 'Ctrl+C' to quit..._
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

The G.SHDSL NTU includes an internal Bit Error Rate Tester (BERT) for complete testing of local and remote modem and the link quality without any need for external test equipment. This built-in Bit Error Rate Test generator can generates a standard 2047 (2^{11}-1) test pattern (Pseudorandom test pattern, 2047 bits in length).

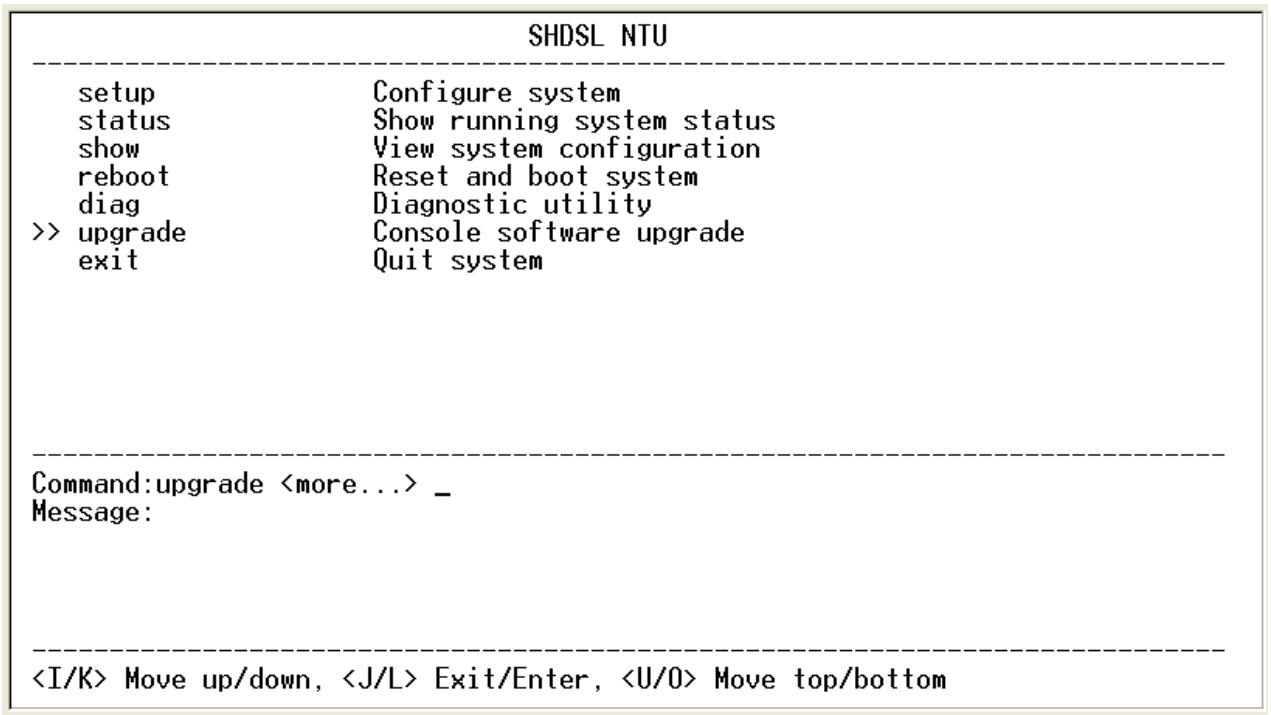
Test Pattern 2047	Use the standard 2047 (2^{11}-1) test pattern
Time Elapsed	Show the time elapsed count
Pattern Framing	Show the linking is **sync** or **no sync**
Bit Error Count	Show the bit error counter
Refresh counter	Page refresh counter

You can press CTRL-C to quit this page anytime.

4.10 [Upgrade] firmware upgrade

This section will introduce how to upgrade the kernel and FPGA code of G.SHDSL NTU. Select **upgrade** in main menu and press [ENTER] or [RIGHT].
Please note that when you use Remote Upgrade feature, it means you can use this feature to update firmware to the remote unit as described below.
During upgrade and re-flash, the normal transmissions will be halted, so the upgrade should be done when the system is taken offline or done during a time of extremely low impact to the customer's line. Any power failure during re-flashing could leave the modem in an unrecoverable state, requiring factory repair.
The upgrade process uses the Xmodem protocol via the rear panel's serial console port.

Following shows the upgrade feature:



Before upgrading the SHDSL NTU, make sure you have the Kernel code and FPGA code files in your computer.

When you upgrade the kernel code, select the **Kernel** item and press [ENTER] or [RIGHT].

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Kernel              Upgrade main software
   Fpga                Upgrade FPGA code
   Rmt Kernel          Upgrade the remote's main software
   Rmt FPGA            Upgrade the remote's FPGA code









--------------------------------------------------------------------------------
Command:Kernel <CR>
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Click Send file in terminal access program, hyper terminal, to send the file. Make sure the sending protocol is **Xmodem**. Select the source file in window and press OK.

When it was upgrading, you can see as following:

```
                                SHDSL NTU
--------------------------------------------------------------------------------

Starting XModem Upload...CCCCCCC









--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

If you want to upgrade the FPGA code, select **FPGA** item and press [ENTER] or [RIGHT].

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Kernel               Upgrade main software
>> Fpga                 Upgrade FPGA code
   Rmt Kernel           Upgrade the remote's main software
   Rmt FPGA             Upgrade the remote's FPGA code









--------------------------------------------------------------------------------
Command:Fpga <CR>
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

When it is upgrading, you will see the following:

```
                                SHDSL NTU
--------------------------------------------------------------------------------

Starting XModem Upload...CCCCCCC









--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

```
                                    SHDSL NTU
--------------------------------------------------------------------------------

Starting XModem Upload...CCCCCCCCCCCCCCCCCCCCCCCCCCCCC
EraseFlash Now.............
Starting to write flash.....................................
Do you want to reboot? (y/n):_









--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

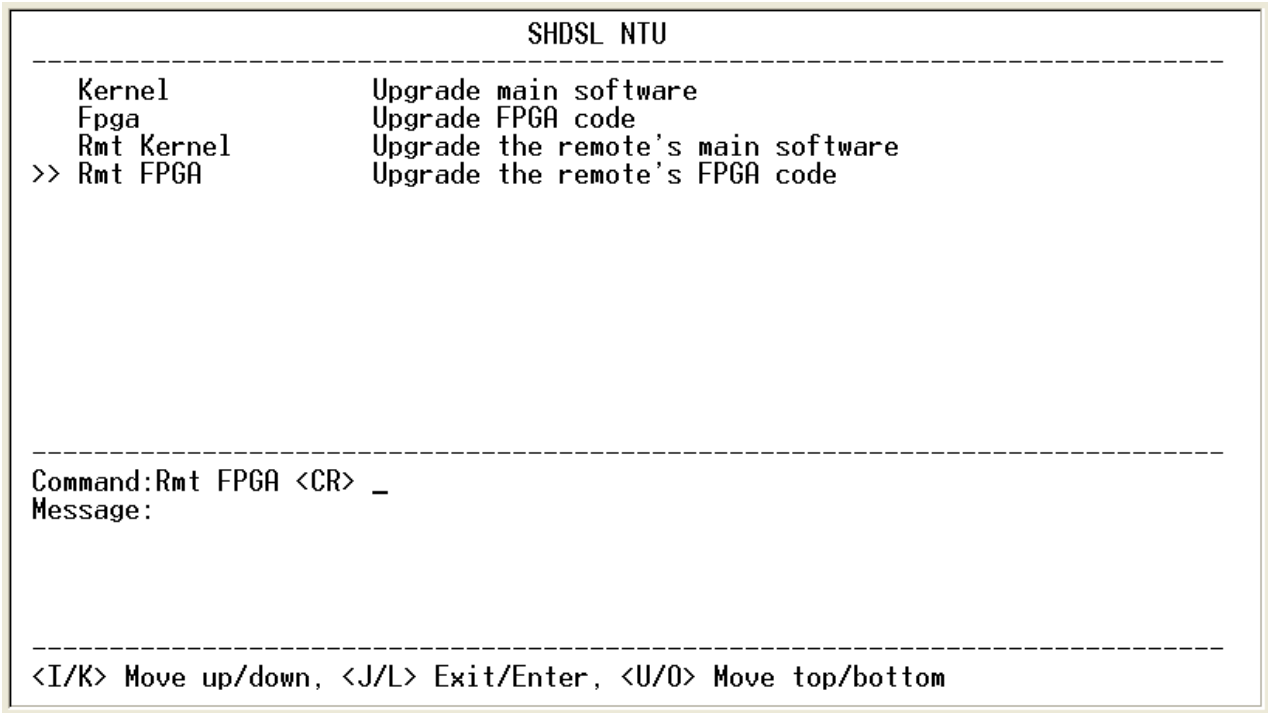
Once the upload is complete, make the final confirmation to erase and re-write the flash with new code. After the upgrade procedure is finished, you can reboot the system, which will load the new firmware version.

If the local side and remote side have connected, you can use the remote side firmware upgrade function.

Below shows the remote upgrade feature:
Remote upgrade - Kernel

```
                                    SHDSL NTU
--------------------------------------------------------------------------------
   Kernel               Upgrade main software
   Fpga                 Upgrade FPGA code
>> Rmt Kernel          Upgrade the remote's main software
   Rmt FPGA             Upgrade the remote's FPGA code









--------------------------------------------------------------------------------
Command:Rmt Kernel <CR> _
Message:




--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Remote upgrade - FPGA


SHDSL NTU
Kernel Upgrade main software
Fpga Upgrade FPGA code
Rmt Kernel Upgrade the remote's main software
>> Rmt FPGA Upgrade the remote's FPGA code
Command:Rmt FPGA <CR> _
Message:
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

Before upgrading the NTU, you must have the Kernel code file and FPGA code file in your computer.

WARNING!!: Do not allow any interruption of power during the erase and re-write operation or the Flash will be left in an unknown state and the device will no longer be able to function. The device must then be returned to the factory for repair.

4.11 [Exit] Exit the system

To exit the system, you can use **exit** command. Select **exit** from the main menu and press [ENTER] or [RIGHT]. Answer y(es) to confirm.

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   setup                Configure system
   status               Show running system status
   show                 View system configuration
   reboot               Reset and boot system
   diag                 Diagnostic utility
   upgrade              Console software upgrade
>> exit                 Quit system









--------------------------------------------------------------------------------
Command:exit <CR>
Message:




--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

After pressing [ENTER], the console will be disconnected.

```
Connection closed...
Press Space key to enter console mode configuration!
```

When disconnected, you may re-connect by pressing [Space] key to restart the login display.

The new login screen will show again, you can type username and password again to re-enter this system.

5 Appendix

5.1 Abbreviations

AIS	Alarm Indication Signal
AMI	Alternate mark inversion
ASYM	Asymmetric
ATM	Asynchronous Transfer Mode
B8ZS	Bipolar with 8 zero substitution
BER	Bit error rate
BERT	Bit Error Rate Tester
BNC	Bayonet Nut Coupling Bayonet Neill-Concelman Barrel Nut Connector Bayonet Nipple Connector Bayonet Navy Connector Baby N Connector
bps	Bits per second
CAS	Channel Associated Signaling
CEPT	European Conference of Postal and Telecommunications Administrations.
CERR	CRC Errors
CO	Central Office
CPE	Customer Premises Equipment
CPU	Central processing unit
CRC	Cyclic redundancy check
CRC4	Cyclic redundancy check 4 bit
CRS	Carrier Sense
CSU	Channel service unit
CTS	Clear to send
DCD	Data carrier detect
DCE	Data communication equipment
DSL	Digital subscriber loop
DSR	Data set ready
DSLAM	DSL Access Multiplexer
DTE	Data terminal equipment
DTR	Data terminal ready
E BIT GEN	Remote End Block Error Bit generation
EOC	Embedded operations channel
ES	Number of Error second (Errors/Second)
ESF	Extended super frame
ETSI	European Telecommunications Standardization Institute

FAS	Frame alignment signal
FCS	Frame Check Sequence
HDB3	High-Density Bipolar of order 3
HDLC	High-Level Data Link Control
HEC	Header error check
I/F	Interface
ITU	International Telecommunication Union
ITU-T	ITU-Telecommunication Standardization Sector
LBO	Line Build Out
LIU	Line Interface Unit
LOC	Loss of Connection
LOF	Loss of frame
LOS	Loss of signal
LOSW	Loss of synchronization word
LTU	Line Termination Unit
MAS	Multi-frame Alignment Sequence (CAS Format)
MFAS	Multi-frame Alignment Sequence (CRC4 Format)
MHz	MegaHertz
NI	Network Interface
NRZ	Non-Return to Zero
NTU	Network Termination Unit
PABX	Private Automatic Branch Exchange
PAM	Pulse Amplitude Modulation
PLL	Phase-locked loop
POTS	Plain Old Telephone Service
PRBS	Pseudo-Random Bit Sequence
PSD	Power spectral density
QRSS	Quasi-Random Signal Source
RAI	Remote alarm indication
RESYNC	Resynchronization
RJ-45	Registered Jack-45
RTS	Request to send
RX	Receiver
SES	Number of Severely error seconds (more than 832 CRC errors / second. Approximately equivalent to a bit error rate of 1×10^{-3}
SDLC	Synchronous data Link Control
SF	Super Frame
SHDSL	Symmetric High-Bitrate Digital Subscriber Loop
SLC	Subscriber Loop Carrier
SMF	Sub-Multi frame
SNA	System Network Architecture

SNR MARGIN	Signal to noise ration margin
STU	SHDSL Terminal Unit
STU-C	SHDSL Terminal Unit - Central office side
STU-R	SHDSL Terminal Unit - Remote side
STU-C-INTCLK	STU-C internal clock
STU-R-EXTCLK	STU-R external clock
SYM	Symmetric
SYNC	Synchronization
TC-PAM	Trellis Coded Pulse Amplitude Modulation
TDM	Time Division Multiplexing
TPS-TC	Transmission Protocol Specific TC layer
TX	Transmitter
Tx Power	Transmission power
UAS	Unavailable second
UI	User interface
WAN	Wide Area Network
xDSL	“Any” DSL , (ADSL , HDSL ,SHDSL or VDSL etc)

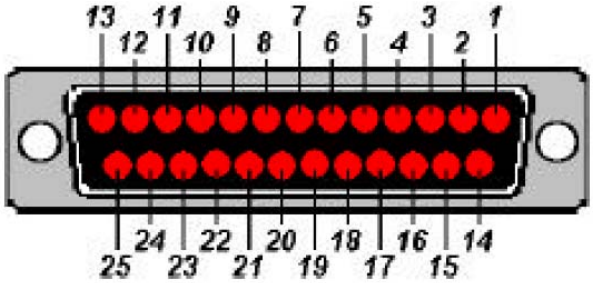
5.2 Data Interface Pin Assignments

The table below displays Data Interface Pin Assignments for the Serial DCE Model

.

Function	Abbrev.	Direction	RS-530 DB-25(F)	V.35 M.34(F)	X.21 DB-15(F)
Frame Ground	FG	N/A	1	A	1
Transmit Data	TD	Input	2	P	2
Receive Data	RD	Output	3	R	4
Request to Send	RTS	Input	4	C	3
Clear to Send	CTS	Output	5	D	
Data Set Ready	DSR	Output	6	E	
Signal Ground	SG	N/A	7	B	8
Data Carrier Detect	DCD	Output	8	F	5
Secondary Receiver Clock	(S)RC	Output	9	X	13
Secondary Data Carrier Detect	(S)DCD	Output	10		12
Secondary External Transmitter Clock	(S)ETC	Input	11	W	7
Secondary Transmitter Clock	(S)TC	Output	12	AA	
Secondary Clear to Send	(S)CTS	Output	13		
Secondary Transmit Data	(S)TD	Input	14	S	9
Transmitter Clock	TC	Output	15	Y	
Secondary Receive Data	(S)RD	Output	16	T	11
Receiver Clock	RC	Output	17	V	6
Local Loopback			18		
Secondary Request to Send	(S)RTS	Input	19		10
Data Terminal Ready	DTR	Input	20	H	
Remote Loopback			21		
Secondary Data Set Ready	(S)DSR	Output	22		
Secondary Data Terminal Ready	(S)DTR	Input	23		
External Transmitter Clock	ETC	Input	24	U	14
Test Indicator			25		

The front view of DB-25(F) Data interface connector on rear panel:



DB-25(F) Connector

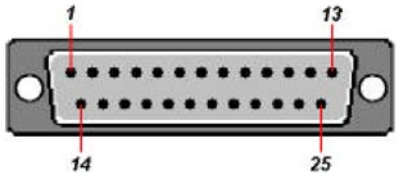
5.3 V.35 DB25(M) to M.34(F) adaptor Cable

If the DTE (Data Terminal Equipment) connector is using 34-pin Winchester type, we must use the cable adaptor from DB-25 to Winchester (M.34).

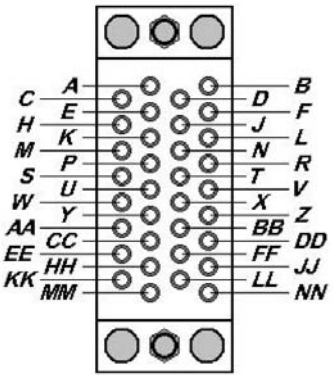
The pin out of cable on DB-25(male) Connector to M.34(female) Connector

DB-25 Pin	Signal	M.34 Pin	Description
2	TD	P	Transmit Data
14	TD	S	Transmit Data
3	RD	R	Receive Data
16	RD	T	Receive Data
4	RTS	C	Ready To Send
5	CTS	D	Clear To Send
6	DSR	E	Data Set Ready
20	DTR	H	Data Terminal Ready
24	XTC	U	DTE Transmit Clock
11	XTC	W	DTE Transmit Clock
15	TC	Y	Transmit Clock
12	TC	AA	Transmit Clock
17	RC	V	Receive Clock
9	RC	X	Receive Clock
1	FGND	A	Protective Ground
7	GND	B	Signal Ground
8	DCD	F	Data Carrier Detect

The front view of DB-25(M) connector and V.35(F) connector on this cable:



DB-25(M) connector



M.34(F) connector

V.35 interface (34-pin Winchester type) contains the following signals:

Pin	Signal	Abbr.	DTE	DCE
A	Chassis Ground	FGND	---	---
B	Signal Ground	GND	---	---
C	Request To Send	RTS	Out	In
D	Clear To Send	CTS	In	Out
E	Data Set Ready	DSR	In	Out
F	Data Carrier Detect	DCD	In	Out
H	Data Terminal Ready	DTR	Out	In
J	Unassigned			
K	Unassigned			
L	Unassigned			
M	Unassigned			
N	Unassigned			
P	Send Data A	SD(A)	Out	In
R	Receive Data A	RD(A)	In	Out
S	Send Data B	SD(B)	Out	In
T	Receive Data B	RD(B)	In	Out
U	Terminal Timing A	SCTE(A)	Out	In
V	Receive Timing A	SCR(A)	In	Out
W	Terminal Timing B	SCTE(B)	Out	In
X	Receive Timing B	SCR(B)	In	Out
Y	Send Timing A	SCT(A)	In	Out
Z	Unassigned			
AA	Send Timing B	SCT(B)	In	Out
BB	Unassigned			
CC	Unassigned			
DD	Unassigned			
EE	Unassigned			
FF	Unassigned			
HH	Unassigned			
JJ	Unassigned			
KK	Unassigned			
LL	Unassigned			
MM	Unassigned			
NN	Unassigned			

V.35 is a partially balanced, partially single-ended interface specification. The data leads and clock leads are balanced, the handshake leads are single-ended.
TD, RD, TC, RC and XTC are differential signals conforming to RS-422/V.11. Remaining signals conform to RS-232.

5.4 X.21 DB25(M) to DB15(F) adaptor Cable

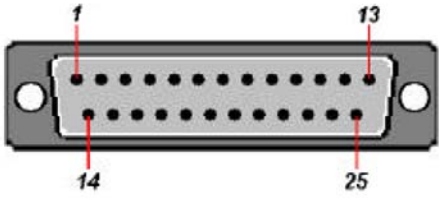
For X.21 application, we must use the DB-25 to DB-15 adaptor cable for connects to a X.21 DTE DB-15 male cable.

The pin out of cable on DB-25(male) Connector to DB-15(Female) (X.21) Connector

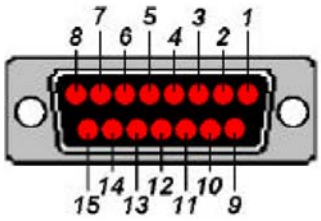
DB-25 Pin	Signal	DB-15 (X.21) Pin	Description
1	FGND	1	Protective Ground
7	GND	8	Signal Ground
2	T	2	Transmit Data
14	T	9	Transmit Data
3	R	4	Receive Data
16	R	11	Receive Data
4	C	3	Request To Send
19	C	10	Request To Send
8	I	5	Data Carrier Detect
10	I	12	Data Carrier Detect
17	S	6	Receive Clock
9	S	13	Receive Clock

All signals are balanced. Meaning there is always a pair (+/-) for each signal, like used in RS422. The X.21 signals are the same as RS422, so please refer to RS422 for the exact details.

The front view of DB-25(M) connector and DB-15(F) connector on this cable:



DB-25(M) Connector



DB-15(F) Connector

The pin out of DB-15 connector on X.25 adaptor cable:

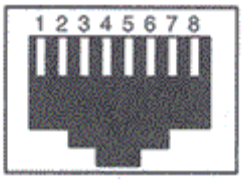
Pin	Signal	Abbr.	DTE	DCE
1	Shield			
2	Transmit (A)	TA	Out	In
3	Control (A)	CA	Out	In
4	Receive (A)	RA	In	Out
5	Indication (A)	IA	In	Out
6	Signal Timing (A)	SA	In	Out
7	Unassigned			
8	Ground			
9	Transmit (B)	TB	Out	In
10	Control (B)	CB	Out	In
11	Receive (B)	RB	In	Out
12	Indication (B)	IB	In	Out
13	Signal Timing (B)	SB	In	Out
14	Unassigned			
15	Unassigned			

Functional Description:

The Signal Element Timing (clock) **(S)** is provided by the DCE. This means that the NTU will output the correct clocking and that X.21 is a synchronous interface. Hardware handshaking is done by the Control **(C)** and Indication **(I)** lines. The Control is used by the DTE and the Indication is used by DCE.

5.5 Console Cable

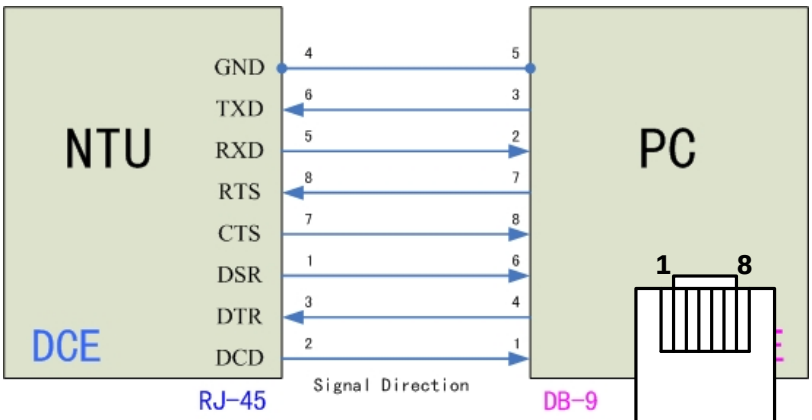
The front view of RJ-45 console cable socket on rear panel:

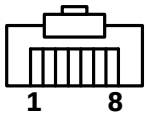


The wire connection of console cable DB-9(Female) to RJ-45:

DB9 (Female)		RJ-45	
1	DCD	1	DSR
2	RXD	2	DCD
3	TXD	3	DTR
4	DTR	4	GND
5	GND	5	RXD
6	DSR	6	TXD
7	RTS	7	CTS
8	CTS	8	RTS
9	NC		

The signal direction of console cable:





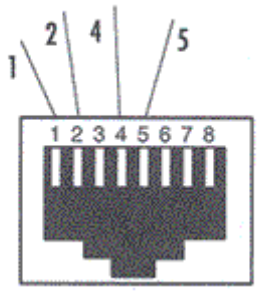
Front View

The pin assignment of RJ-45 modular jack on the co e:

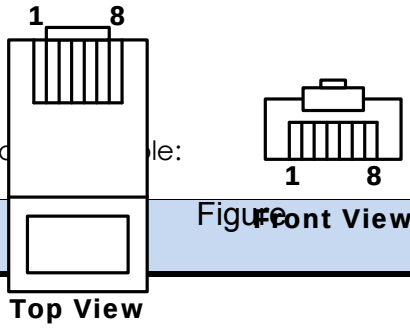
Pin Number	Abbrev.	Description	Figure
1	DSR	DCE ready	
2	DCD	Received Line Signal Detector	
3	DTR	DTE ready	
4	GND	Signal Ground	
5	RXD	Received Data	
6	TXD	Transmitted Data	
7	CTS	Clear to Send	
8	RTS	Request to Send	

5.6 E1 Balance Cable

The front view of RJ-48C E1 balance cable socket on rear panel:



The pin out of RJ-48C plug on the G.703 120Ω E1 bc ble:



Figure

Pin Number	Description
1	E1 interface receive pair-ring
2	E1 interface receive pair-tip
3	No connection
4	E1 interface transmit pair-ring
5	E1 interface transmit pair-tip
6	No connection
7	No connection
8	No connection

The pin out of cable on DB-15(female) Connector to RJ-48C Connector:

DB15(Female) Pin Number	RJ-48C Pin number	Description
11	4	Transmit Ring
5	3	Rx Shield
9	1	Receive Ring
6	6	TX Shield
3	5	Transmit Tip
1	2	Receive Tip

5.7 E1 Unbalance Cable

Connections to the E1 BNC ports are made using a 75-ohm coaxial cable with a bayonet-style twist-lock BNC connector.
We do not provide the cable. It is widely available from other sources.

The front view of BNC sockets on rear panel:

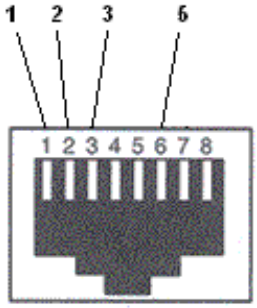
The internal wiring between BNC sockets and RJ-48C:

Signal Name	BNC Connecters	RJ-48C Connector
Transmit Tip	Center pin of Tx Connector	5
Transmit Ring	Shield of Tx Connector	4
Receive Tip	Center pin of Rx Connector	2
Receive Ring	Shield of Rx Connector	1

5.8 Ethernet Cable

The Ethernet cables should be 4 pair unscreened cable (UTP) or screened (STP) of type CAT5 (or higher).
Both crossed and normal wiring styles are supported by the auto-MDIX feature of the NTU.
We do not provide the cable. It is widely available from other sources.

The front view of RJ-45 Ethernet cable socket on rear panel:

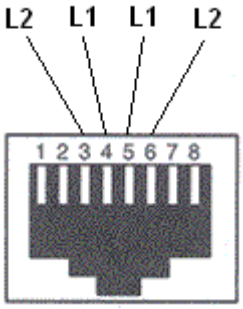


The pin out of RJ-45 Ethernet Connector:

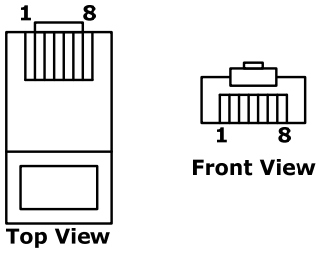
Pin number	Signal Name
1	Transmit Data **+**
2	Transmit Data **-**
3	Receive Date **+**
4	Not used
5	Not used
6	Receive Date **-**
7	Not used
8	Not used

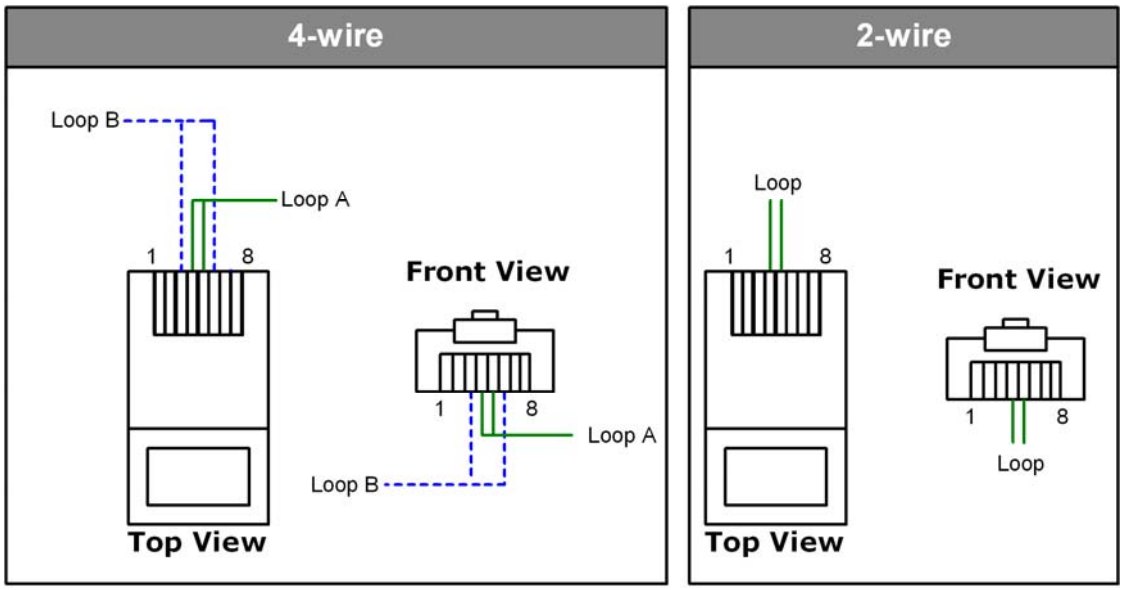
5.9 DSL Cable

The front view of DSL cable socket on rear panel:



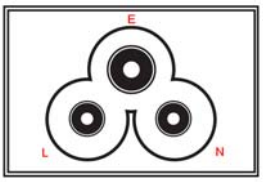
The pin out of RJ-45 modular jack on DSL cable:

Pin Number	Description	Figure
1	No connection	
2	No connection	
3	LOOP 2 Input/Output	
4	LOOP 1 Input/Output	
5	LOOP 1 Input/Output	
6	LOOP 2 Input/Output	
7	No connection	
8	No connection	



5.10 Power Cord

The front view of IEC-320 C6 type AC Inlet on rear panel:



The pin out of AC Inlet connector:

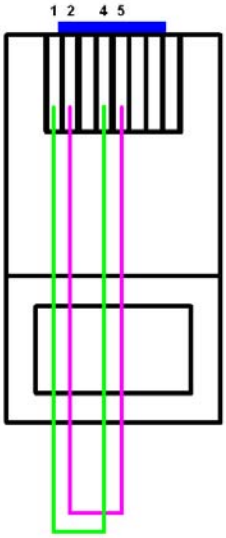
Pin number	Description
E	Earth conductor
L	Live, hot or active conductor
N	Neutral or identified conductor

The socket of the power cord is using IEC-320 C5 type. This 3-connector colloquially called “Mickey Mouse” or “Clover Leaf”.

The front view of C5 line socket of the power cord:

5.11 Illustration of Loopback connection device (E1)

RJ-48C	Description



a RJ-45 module jack of the following:

on short circuit/wiring:

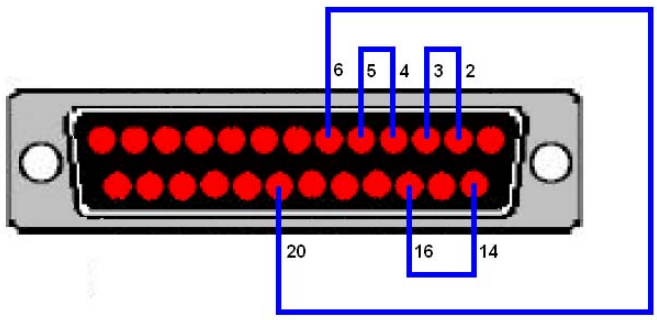
5.12 Illustration of Loopback connection device (Data)

DB-25(M) Pin number	Signal	Description
2	TD(A)	Transmit Data
14	TD(B)	Transmit Data
3	RD(A)	Receive Data
16	RD(B)	Receive Data
4	RTS	Ready To Send
5	CTS	Clear To Send
6	DSR	Data Set Ready
20	DTR	Data Terminal Ready
24	XTC	DTE Transmit Clock
11	XTC	DTE Transmit Clock
15	TC(A)	Transmit Clock
12	TC(B)	Transmit Clock
17	RC(A)	Receive Clock
9	RC(B)	Receive Clock
1	FGND	Protective Ground
7	GND	Signal Ground
8	DCD	Data Carrier Detect

Make the short circuit/wiring with a DB-25(male) connector of the following:

PIN2 ←----→PIN3
PIN14←---→PIN16
PIN4 ←----→PIN5
PIN6 ←---→PIN20

The back side view of DB-15(male) connector on short circuit/wiring:



This page left blank intentionally.

CTC union

www.ctcu.com

T +886-2 2659-1021 F +886-2 2659-0237 E info@ctcu.com

ISO 9001 Quality System Certified CTC Union Technologies Co.,LTD.

All trademarks are the property of their repective owners. Technical information in this document is subject to change without notice.